TECHNICAL REPORT 3075

DEVELOPMENT OF THE DEMOLITION KIT, BLASTING, XM175

EDMUND DEMBERG

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SEPTEMBER 1963

PICATINNY ARSENAL
DOVER, NEW JERSEY

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DEVELOPMENT OF THE DEMOLITION KIT, BLASTING, XM175

BY

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SECTION I

INTRODUCTION

The purpose of this investigation was to develop a kit, consisting of four shaped charges and non-electric priming accessories for producing pilot holes in frozen soil, suitable for hand driving anchoring stakes for the Littlejohn launcher. It was necessary to qualify the developed kit and its components as safe for handling, storing and shipping.

The need for such a kit was established and the investigation started by Rock Island Arsenal, Rock Island, Illinois. The Rocket Launcher, XM34, for the Phase II Littlejohn System, was designed by Rock Island Arsenal, Research and Development Division, primarily to accurately launch the Littlejohn rocket (Reference 1). The rocket requires a stable platform for accurate launching. A major problem encountered with the Phase II Littlejohn system was the inability to anchor the launcher simply and quickly in Arctic regions (Reference 2). In an effort to solve the problem, studies were instituted to develop an effective anchoring method without the use of elaborate support equipment (Reference 3).

One area of study indicated a satisfactory method of tying down the Littlejohn launcher in Arctic terrain (Reference 4). Although normal tie-down stake driving operations are nearly impossible in Arctic regions, it was found that they could be effected if pilot holes could be made in the frozen ground. To achieve the pilot hole without using elaborate support equipment, it was proposed that a shaped explosive charge be used. Preliminary investigations and feasibility studies indicated that this approach was highly satisfactory. A commercially available shaped charge, containing approximately 2-3/4 oz of 95/5 RDX/Wax, produced acceptable pilot holes when tested in the Arctic (Reference 5). The results warranted the investigation of a shaped charge which would meet military requirements but retain the same or superior lancing characteristics as the tested item.

In October 1961, a representative of Picatinny Arsenal visited Rock Island Arsenal to discuss the problem. This discussion and subsequent communications resulted in Picatinny Arsenal being designated the responsibility of developing a kit for producing acceptable pilot holes in frozen ground and Arctic terrain (Reference 6).

SECTION II

SUMMARY

The development of the XM175 Blasting Demolition Kit was completed by Picatinny Arsenal in April 1962. The kit consists of four XM106 Demolition Charges, a single length of detonating cord strung through transverse holes in each charge and non-electric priming accessories. The XM175 Blasting Demolition Kit produces pilot holes in frozen soil acceptable for the hand driving of anchoring stakes for the Littlejohn launcher.

A unique packaging arrangement enables the kit to be unpacked, assembled, positioned and fired, by a User wearing Arctic mittens, in a matter of minutes. No special training is required to function the kit correctly.

Performance of the MX175 Blasting Demolition Kit was satisfactory during engineering tests and the kit was released to Rock Island Arsenal in April 1962. The test data shows the XM175 Kit is reliable and safe for handling by troops. It complies with the necessary military standard tests and I.C.C. storage, handling and shipping regulations.

SECTION III

CONCLUSION

The Demolition Kit, Blasting, XM175 is a safe and reliable item, for producing holes in frozen ground acceptable for the hand driving of anchoring stakes for the Littlejohn launcher. The kit is a light, compact item that can be properly functioned by a User wearing Arctic mittens. The kit meets I.C.C. regulations and military standard tests regarding storing, handling and shipping.

SECTION IV

RECOMMENDATIONS

1. The Demolition Kit, Blasting, XM175 should become part of the Littlejohn system for use in anchoring the launcher in Arctic terrain.

2. The kit or variations of the kit should be considered for solving Ordnance Problem 143, (U.S. Army Problem Guide Vol IV 1 July 1960) Subject: Develop a technique for anchoring rocket or missile launchers.

SECTION V

STUDY

The Demolition Kit, Blasting, XM175 consists of four XM106 Demolition Charges and priming accessories assembled into a unique package. Each kit contains five inner boxes: four containing one shaped explosive charge each and detonating cord, while the fifth contains the initiating components. Each of the four inner boxes has a 6-inch square base and is made of material that produces no dangerous fragmentation when the shaped charges are fired. Each box holds the shaped charge in such a manner that its base is at the desired stand-off distance from the ground when unpacked for use in the field. The box contains the proper amount of detonating cord so the shaped charges can be laid out to fit a schematic diagram inclosed in each package. The cord is coiled in the box and uncoils as the box is opened and positioned for firing. Each box is opened by pulling off a strip of tape with a tab on one end for easy removal. The package comes to the User with the cord already strung through the shaped charge items. One end of the detonating cord is crimped into an adapter, especially designed for this kit. This adapter simplifies the attachment of the detonating cord to the initiation assembly in the field. The whole package is so designed that it can be unpacked, assembled, positioned and fired by a User wearing Arctice mittens in a matter of minutes. The User requires no special training to use the kit.

The XM175 Demolition Kit weighs approximately 26 lbs. and has outside dimensions of 17-11/16" x 14-3/8" x 10-25/32". A wooden crate is used to provide the desired protection for shipment and storage. The contents of the outer wooden crate are enclosed in a barrier material bag for waterproofness. Although the bag permitted water to enter during a 24-hour submersion test, the kit functioned satisfactorily. If properly sealed, no water should reach the inner cartons. The kit was not effected by the transportation vibration test and is safe for proper shipping and handling. It has an I.C.C. classification of High Explosive - Class A and a classification of Class 9 in accordance with the Ordnance Safety Manual.

The shaped charge, designated as Charge, Demolition XM106, four of which are in the kit, consists of a 75-gram shaped explosive charge of 95/5, RDX/wax. A thin 80° angle copper cone and a 12-grain RDX booster are imbedded in opposite ends of the charge. The assembly, except for the cone, is inclosed in a bakelite case. Detonating cord is strung through a transverse hole located in the bakelite case just above the booster.

Functioning tests with the XM106 Demolition Charges produced holes in frozen ground into which the Littlejohn restraining stake could be quickly

and easily driven with a sledge hammer. The XM106 Demolition Charges, singly or in multiples of four, were initiated with detonating cord. They are safe for handling by troops as indicated by the failure of the rifle bullet impact, crush or cook-off to produce any evidence of explosion. Tests indicated the XM106 Demolition Charge was not adversly effected by salt spray, cycling between temperature extremes (-65°F and 160°F) and storage at -65°F.

Incompatibility of some ingredient with the explosive charge (RDX/wax, 95/5) in the XM106 Demolition Charge was indicated by two non-firings after storage at 160°F for 30 days and a low flash point of 200°F obtained in one of the cook-off tests. The explosive charge was compatible with the cement (DuPont No.4678) used in the tested items. The other ingredient that could be incompatible with RDX is the wax used in the tested items. The wax specified for use in the demolition charge is specified for use with RDX in specification MIL-R-13738 (ORD), November 1954. Therefore, no incompatibility should exist if the XM106 Demolition Charges are manufactured according to the prepared drawings XP-117070 to XP-117074. These drawings and a subsequent specification should establish a standard for the manufacture of the XM106 Demolition Charges to assure an adequate level of performance.

When the XM106 Demolition Charge was fired over permafrost at a 3-1/2-inch standoff during Arctic test, deeper holes were made than with commercial charges tested under similiar conditions (Reference 4). This was due to the larger explosive charge in the XM106 Demolition Charges, 75 grams as compared to 55 grams in the commercial item tested. The deeper holes were superior for the hand driving of the Littlejohn stake.

The satisfactory performance of the XM106 Demolition Charge during engineering tests warrants its use in the XM175 Blasting Kit.

Drawings and pictures of the kit and its components are in Appendix B. The prescribed procedure for operating the kit (contained in each kit and used in the engineering tests) is described in Appendix D.

To alleviate the expense and time consuming operation of preparing frozen ground for each test, it was decided to fire the kit and/or charges into #1020 steel plates. It was necessary to establish a correlation factor between penetration depths in frozen ground and #1020 steel to correlate this with previous data. To accomplish this objective, a compilation was prepared of penetrations obtained when XM106 Demolition Charges were fired at a 3-1/2-inch standoff into #1020 steel plates and into frozen ground.

The geometric means of the penetrations were determined (Reference 10). One inch penetration in #1020 steel was equivalent to 2-3/5 inches penetration in frozen ground. The compilation and graphs used in the determination are shown in Table 4 and Figure 45 and 46.

A literature review revealed 15 inches was a minimum penetration in frozen ground suitable for the hand driving of the stake for anchoring the Littlejohn launcher (Reference 2, 3, 4, 5 and 8). This is equivalent to a penetration in #1020 steel of 5-10/13 inches.

In engineering tests described on subsequent pages, the functioning of the XM175 Demolition Kit was considered satisfactory when all four XM106 Demolition Charges fired and produced holes in frozen ground (or equivalent holes in #1020 steel) suitable for the hand driving of the Littlejohn launcher retainer stake. A functioning test of the XM106 Demolition Charge was satisfactory when it produced suitable holes in frozen ground (or equivalent holes in #1020 steel).

Engineering Test Results And How Obtained

Arctic Firing

Fifteen XM106 Demolition Charges were fired at Fort Greely, Alaska, at temperatures from 0° to 35°F. Fourteen charges were fired with detonating cord at a 3-1/2-inch standoff into the ground. One of the charges was fired with the cone of the charge directed at a 3/4-inch thick, plywood target, 20 feet away. Charge 14 was fired into the hole made by Charge No. 4.

There were no noticeable effects on the items tested due to the Arctic climate. All charges functioned and produced holes in the permafrost of not less than 18 inches and averaging 21-1/2-inches deep. The entrance hole diameters were approximately one inch. No difficulty was experienced in driving the Littlejohn stake in two attempts. The results obtained in the Arctic tests are listed in Table 1 (Reference 8).

Functioning At High And Low Temperatures (160°F and -65°F)

Five and 25 XM106 Charges were conditioned for 48 hours and fired at 160°F and -65°F, respectively. All charges were initiated with detonating cord at a 3-1/2-inch standoff over #1020 steel and produced satisfactory penentrations (Table 2).

Crush

Six XM106 Demolition Charges were placed in various positions between steel plates and a 150-lb steel weight and dropped from a height of nine feet onto the upper plate. The charges were crushed with no evidence of explosion.

Multiple Initiation

A 50-foot length of detonating cord was strung through the transverse holes in the necks of four XM106 charges. In five separate tests, the detonating cord initiated the four shaped charges. The charges were fired at a 3-1/2-inch standoff over #1020 steel and produced satisfactory penetrations (Table 3).

Rifle Bullet Test

Ten XM106 Charges were subjected to the impact of caliber .50 bullets fired from a distance of six feet. The bullets were fired twice into each of the following positions of the charges: neck, copper cone, side, top and booster. There was no evidence of explosion in any of the ten tests.

Cook Off

Five XM106 Demolition Charges were heated as rapidly as possible by winding 500 watt Cal-Rod heating units around the charges and applying the required voltage. No attempt was made to monitor the temperature of the charges but rather to determine if the items could be exploded by heat. These items burned without explosion.

Additional items were placed in an oven and gradually heated. The temperature was monitored by thermocouples cemented to the copper cones of each charge. The four additional tested charges burned without explosion. The results were:

ITEM NO	RATE OF HEATING, °F/MIN	FLASHING POINT, °F
1	14.5	340
2	5.75	305
3	10.75	335
4	7.00	200

Average Flashing Point 295°F

Low Temperature Storage

Twenty-five XM106 Charges were stored at -65°F for 30 days. Upon completion of the test, the conditioned items were visually exmained and fired at ambient temperature, with detonating cord at a 3-1/2-inch stand-off, over #1020 steel plates.

There were no visual effects of the conditioning on the 25 charges. All the charges fired and produced satisfactory penetrations (Table 2).

High Temperature Storage

Five XM106 Demolition Charges were stored at 160°F for 30 days. Upon completion of the test the charges were visually examined and fired at ambient temperature, with detonating cord at a 3-1/2-inch stand-off, over #1020 steel plates

The cement around the copper cones of the five charges was blackened and each of the bakelite cases had darkened considerably. Soot was present on all five items. When these charges were initiated with detonating cord, two of the charges failed to explode.

The conditioning and firings were repeated with 25 additional charges. These charges emerged from the 160°F storage with no visual effects. The 25 charges were initiated with detonating cord at a 3-1/2-inch stand-off over #1020 steel. All charges exploded and produced satisfactory holes (Table 2).

JAN Cycling

Five XM106 Charges were temperature-cycled according to the procedure described in MIL-STD-304.

There were no visual effects due to the JAN Cycling on the five charges. The charges functioned after the test and produced satisfactory penetrations (Table 2).

Lethal Range of Fragments and Blast

Ten XM106 Demolition Charges were fired in normal position. Two firings were over rocky terrain, four firings over frozen ground and four charges at one time in positions used to secure the Littlejohn launcher. The rocky terrain was simulated by covering the ground with five to six inches of gravel and the frozen ground was obtained by freezing the immediate area with dry ice.

Fragmentation and blast patterns around charges positioned horizontally were obtained by firing the charges above one-foot -square steel plate. The steel plate was utilized to provide uniformity and for ease and accuracy positioning. The fragment targets and gages were placed along lines from the center of the charge with the direction being measured from the axis of ths charge. Zero degree is taken to be the direction of the charge axis on the jet end. Three items were fired with the targets along 0^{o}, and four with the targets along 45^{o}.

Peak-pressures and impulses were measured at 90^{o}, 45^{o} and 15^{o}. The shock-wave velocity for the peak-pressure determination was measured with six piezo electric gages covering the range from approximately 1.5 - 15.5 feet from the charge. The impulse data was measured with four impulse gages, two at three feet and two at seven feet. The effects of fragmentation were measured with twelve targets, each consisting of a five-foot square of brown wrapping paper taped to steel frames. These targets were placed at distances of 10, 20 and 40 feet from the charges at 90^{o} intervals around the charges.

Holes produced in targets by fragments and debris resulting from firings of the XM106 Demolition Charges are tabulated in Table 5. The peak-pressures and impulses obtained in the firings, versus the direct distances are plotted in Figures 47-49 (Reference 9).

Salt Spray

Five XM106 Demolition Charges were exposed to salt spray according to the procedure described in MIL-STD-306. Upon completion of the test, the items were examined and functioned.

There were no visible effects to the five exposed items, other than small deposits of salt on the copper cones. The charges all fired when initiated with detonating cord. The penetrations in #1020 steel were satisfactory (Table 3).

Compatibility of RDX/Wax and DuPont Cement No. 4678

The RDX/wax and Cement (DuPont No 4678) used in the demolition charges tested were exposed to $100^{o}C$ for 40 hours in intimate contact according to the procedure described in Picatinny Arsenal Technical Report FRL-TR-25. No gas was evolved.

Propagation Through The XM38 Adapter

The narrow end of priming Adapter, XM38, was crimped onto a length of detonating cord over a relay assembly. The blasting cap of the ignitor assembly (Dwg XP 117799, Appendix B) was inserted into the adapter. An M60 Igniter was fired and the detonating cord was initiated after a 40-second delay. The propagation through the XM38 Adapter was satisfactorily repeated in five separate tests.

Functioning Test of Demolition Kit

Five XM175 Kits were fired in accordance with the procedure in Appendix D. The kits were fired into frozen ground or #1020 steel plates. The frozen ground was prepared by filling containers with soil, saturating the soil with water and maintaining the containers and contents for 48 hours at -65°F.

Four of the five XM175 Kits functioned satisfactorily, producing four holes in frozen ground (or #1020 steel). In the fifth kit, two of the four shaped charges and part of the detonating cord failed to explode. The two charges functioned when the detonating cord was re-initiated. It was determined that failure of the kit to perform satisfactorily was due to a closed loop in the detonating cord, which caused a cut-off in the explosive train. This situation does not occur if the prescribed procedure is accurately followed. The penetrations obtained were all satisfactory (Table 3).

Transportation Vibration

One XM175 Kit was secured in a Naval Ordnance Laboratory Vibrator, Type 2, and tested according to the procedure described in MIL-STD-353. Upon completion of the test, the kit was examined and functioned.

There were no visible effects on the XM175 Kit due to the transportation vibration test. When the kit was functioned it produced four acceptable holes in #1020 steel plates (Table 3).

Waterproofness

An XM175 Demolition Kit was completely submerged in one foot of water for 24 hours. The kit was examined and functioned upon completion of the test.

Visual examination after the test disclosed the inner cartons of the

kit were wet. The kit, however, functioned satisfactorily according to prescribed procedure. The penetrations obtained are in Table 3.

Arctic Functioning of Kit

The initial evaluation by the U.S. Army Arctic Test Board was conducted on one demolition kit containing detonating cord complying with MIL-C-17124A, Type I, Class D. It was found that the detonating cord became stiff in cold weather preventing proper positioning of the shaped charges. This caused improper functioning of the demolition kit. This deficiency was corrected by employing a detonating cord containing a flexible explosive core encased in a nylon sleeve. The flexible explosive core complies with MIL-E-46676(MU).

The demolition kit containing the flexible explosive detonating cord was retested in cold weather (-65°F) and found satisfactory. The cord remained flexible and enabled the shaped charges to be properly positioned.

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APPENDICES

APPENDIX A

TABLES

TABLE 1

RESULTS OF ARCTIC FIRINGS OF THE XM106 DEMOLITION CHARGES

Number	Firing Method	Soil Type	Penetration of 1/8" Diameter Rod	Remarks
1	a	b	19-1/2	20 seconds to drive stake 6"
2	a	b	22	
3	a	b	19-1/2	
4	a	b	18	
5	c	d	23-3/4	10 seconds to drive stake 6"; 20 seconds all the way
6	e	f	20-1/2	
7	e	f	24-3/4	
8	e	f	20-1/2	
9	e	f	21	
10	g	f	23	
11	g	f	22	
12	g	f	21-1/2	
13	g	f	25-1/2	
14	h	i	j	
15	k	-	-	Many holes in target over a 2 foot-diameter circle

a - Blasting machine, wire, E2B cap, detonating cord, 3-1/2" stand-off. Four perforators fired at one time.

b - Soil consisted mainly of gravel.

c - Blasting machine, wire, E-2B cap, 3-1/2" stand-off.

d - Soil consisted mainly of river silt.

e - Burning cigarette, blasting time fuse, J-1 nonelectric cap, detonating cord paper standoff cones. Four perforators fired at one time. UK coupler in middle of detonating cord.

f - Soil consisted of river sand and clay with little gravel.

g - M2 fuse lighter, blasting time fuse, J-1 nonelectric cap, detonating cord, 3-1/2" standoff. Four perforators fired at one time. UK coupler between J-1 and cord.

h - M2 fuse lighter, blasting time fuse, J-1 nonelectric cap, 3-1/2" standoff.

i - Soil same as f but round fired over a hole made by a previous shot.

j - Hole 11-1/2" deep before firing perforator 14. Hole 22" deept after firing perforator 14. Diameter of hole increased from approximately 1" to 2".

k - M2 fuse lighter, blasting time fuse, J-1 nonelectric cap. Perforator on a wooden table in horizontal position; 3/4" plywood target 40 feet away.

TABLE 2

PENETRATIONS OBTAINED FROM XM106 DEMOLITION CHARGES STORED AND FIRED AT TEMPERATURE EXTREMES

Test Designation	Frequency[1]	Depth of Penetration[2] in #1020 Steel, inches	Remarks
Low Temperature Storage			
	1	6	Items were
	1	6-1/2	conditioned at
	2	6-3/4	-65°F for 30
	7	7	days and fired
	2	7-1/8	ambient temp-
	4	7-1/4	erature
	7	7-1/2	
	1	7-3/4	
High Temperature Storage			
	1	6	Items were
	3	6-1/2	conditioned at
	2	6-3/4	160°F for 30
	12	7	days and fired
	9	7-1/2	at ambient
	1	7-3/4	temperature

TABLE 2 (CONTINUED)

PENETRATIONS OBTAINED FROM XM106 DEMOLITION CHARGES STORED AND FIRED AT TEMPERATURE EXTREMES

Test Designation	Frequency[1]	Depth of Penetration[2] in #1020 Steel, inches	Remarks
Functioning at Low Temperature	3	6-3/8	Items were conditioned at -65°F for 48 hours
	2	6-1/4	
	5	7-1/2	
	4	6-3/4	
	2	7	
	2	7-1/8	
	4	7-1/4	
	1	7-3/4	
	1	7-7/8	
	1	8-1/8	
Functioning at High Temperature	1	6-1/2	Items were conditioned at 160°F for 48 hrs
	3	7-1/4	
	1	7-1/2	

1 Frequency represents the number of times the same depth of penetration was recorded. The entry hole diameters were all 3/4 inch.

2 Charges were all fired with detonating cord into #1020 steel at a 3-1/2 inch stand-off.

TABLE 3

PENETRATION OBTAINED FROM XM106 DEMOLITION CHARGES FUNCTIONED DURING TESTING PROGRAM

Test Designation	Test No.	Package No.	Depth of Penetration, Inches: Frozen Ground	Depth of Penetration, Inches: #1020 Steel	Remarks
Functioning	1	1	15		Average diam-
		2	16		eter of initial
		3	15-1/2		hole in the
		4	17		frozen ground
	2	1	17-1/2		was 1.1 inch
		2	16-1/2		
		3	19		
		4	16-1/2		
	3	1	17-1/2		
		2	17-1/2		
		3	17-1/2		
		4	17-1/2		
	4	1	17		
		2	17		
		3	17		
		4	17		

TABLE 3 (CONTINUED)

PENETRATION OBTAINED FROM XM106 DEMOLITION CHARGES FUNCTIONED DURING TESTING PROGRAM

Test Designation	Test No.	Package No.	Depth of Penetration, inches: Frozen Ground	Depth of Penetration, inches: #1020 Steel	Remarks
	5	1		6-3/4	Diameter of
		2		7	initial hole in
		3		7-1/2	steel was
		4		7-1/2	consistently 3/4"
Transportation Vibration	1	1		7-1/8	
		2		7	
		3		7-1/8	
		4		7-1/8	
Waterproofness	1	1		7	
		2		6-3/4	
		3		7-1/2	
		4		7-1/8	
Salt spray	1			6-1/4	
	2			6-7/8	
	3			6-1/2	
	4			7-1/4	
	5			7-1/8	
Multiple	1	1		7-1/8	All charges

TABLE 3 (CONTINUED)

PENETRATION OBTAINED FROM XM106 DEMOLITION CHARGES FUNCTIONED DURING TESTING PROGRAM

Test Designation	Test No.	Package No.	Depth of Penetration, Inches Frozen Ground	Depth of Penetration, Inches #1020 Steel	Remarks
Ignition		2		6-2/3	appeared to
		3		7-1/4	detonate simult-
		4		6-1/2	aneously.
	2	1		6-3/4	Charges were
		2		7-1/4	strung approx.
		3		7-3/4	6 ft. apart
		4		6-3/4	
	3	1		6-3/4	
		2		8	
		3		7	
		4		6-1/2	
	4	1		7-1/2	
		2		7-1/2	
		3		7-3/4	
		4		7	

TABLE 3 (CONTINUED)

PENETRATION OBTAINED FROM XM106 DEMOLITION CHARGES FUNCTIONED DURING TESTING PROGRAM

Test Designation	Test No.	Package No.	Depth of Penetration, inches: Frozen Ground	Depth of Penetration, inches: #1020 Steel	Remarks
	5	1		7	
		2		6-1/4	
		3		4-3/4	Item bifurcated,
		4		6-3/4	producing two ini-
JAN Cycle	1			7-1/8	tial holes in the top
	2			7-1/8	steel plate, each
	3			6-1/2	approximately 3/4
	4			6-1/2	inches in diameter.
	5			6-1/2	

TABLE 4

COMPOSITE OF PENETRATION RESULTS TO DETERMINE RATIO OF FROZEN GROUND TO #1020 STEEL

PENETRATIONS IN FROZEN GROUND

Depth of Penetration, Inches	Midpoint, Inches	Frequency	Cumulative Frequency, Percent
15-16	15-1/2	3	7.1
16-17	16-1/2	4	16.7
17-18	17-1/2	10	40.5
18-19	18-1/2	5	52.4
19-20	19-1/2	6	66.7
20-21	20-1/2	4	76.2
21-22	21-1/2	3	83.3
22-23	22-1/2	3	90.5
23-24	23-1/2	2	95.2
24-25	24-1/2	2	100.0
		42	

PENETRATION IN #1020 STEEL

Depth of Penetration, Inches	Frequency	Cumulative Frequency, Percent
4-3/4	1	0.9
5	0	-

TABLE 4 (CONTINUED)

COMPOSITION OF PENETRATION RESULTS TO DETERMINE RATIO OF FROZEN GROUNDS TO #1020 STEEL

PENETRATION IN #1020 STEEL

Depth of Penetration, Inches	Frequency	Cumulative Frequency, Percent
5-1/4	0	-
5-1/2	0	-
5-3/4	0	-
6	3	3.1
6-1/4	6	8.7
6-1/2	10	17.4
6-3/4	16	31.3
7	32	59.1
7-1/4	22	78.3
7-1/2	17	93.0
7-3/4	5	97.4
8	2	99.1
8-1/4	$\frac{1}{115}$	100.0

TABLE 5

TABULATION OF TARGET HOLES PRODUCED BY XM106 DEMOLITION CHARGE[1]

Direction of Fire	Terrain	Angle	Distance Of Targets From Changes, In Feet															Comments
			10					20					40					
			Hole Sizes, Inch															
			1/2	1/4	1/8	1/16	Pin	1/2	1/4	1/8	1/16	Pin	1/2	1/4	1/8	1/16	Pin	
Into Ground	Gravel	90°	4	3	11	---	121	---	---	---	---	38	---	---	---	---	---	Rocks stuck in 10 ft target
Into Ground	Frozen Ground	90°	1	7	1	9	192	---	1	1	---	33	---	---	---	---	---	Rocks stuck in 20 ft target
At Center of Target	-----	0°	22	10	3	24	18	8	4	6	---	24	2	3	1	---	12	2-1/2" diam. hole at 0° in 10 ft target, 6" hole at 0° in 20 ft target 2-1/2" hole at 0° in 40 ft target
At Center of Target	-----	90°	---	3	8	2	245	---	---	---	---	13	---	---	---	---	---	
At Center of Target	-----	180°	4	3	---	---	19	---	---	---	---	14	---	---	---	---	---	
45° with respect to Paper Target	-----	135°	4	21	60	114	218	1	4	14	16	30	---	1	---	---	2	
45° with respect to Paper Target	-----	45°	---	1	24	46	61	---	3	9	18	12	---	2	---	4	---	Rocks stuck in 20 ft target

1 Reference 8.

APPENDIX B

FIGURES

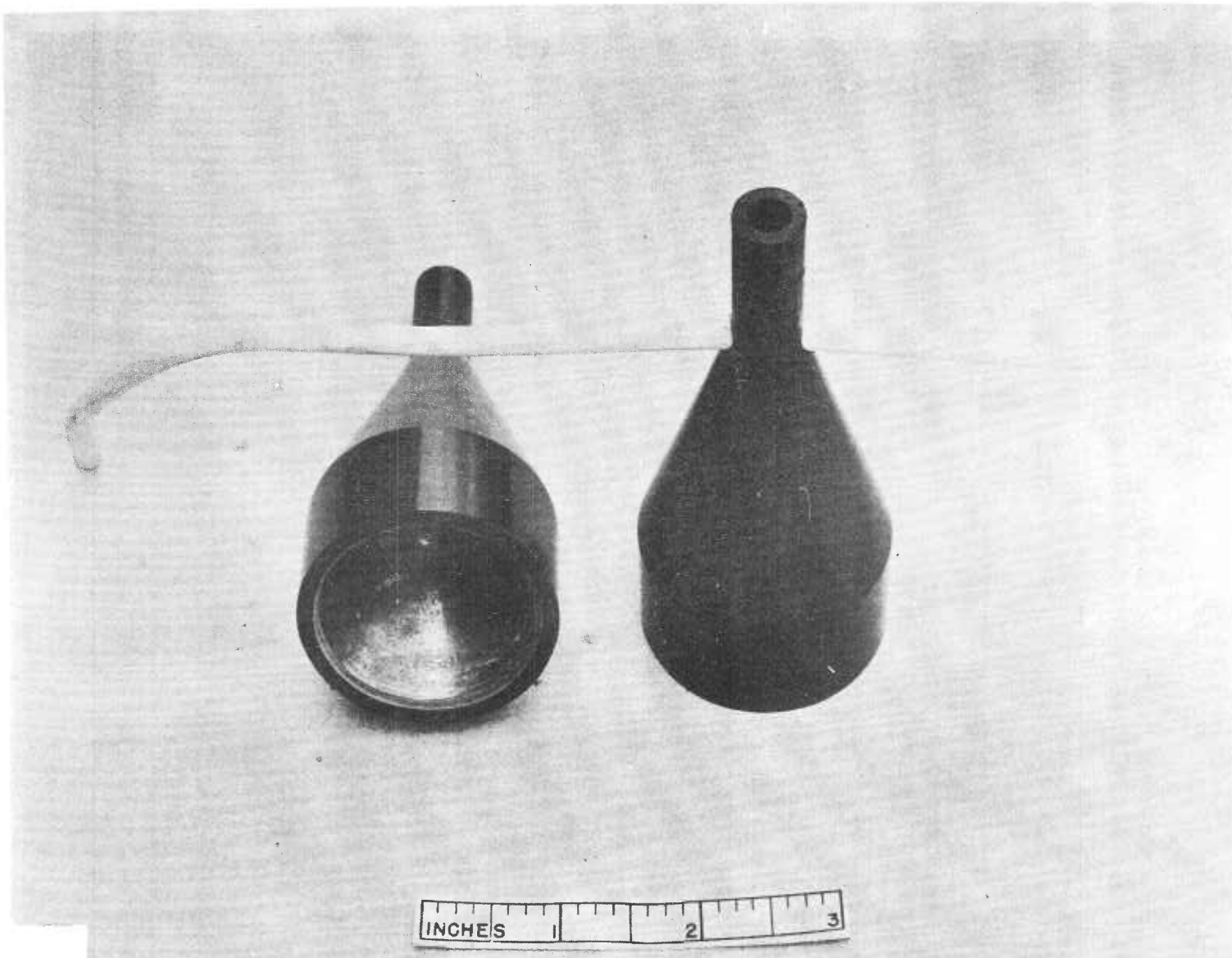


Figure 1. Charge, Demolition, XM106

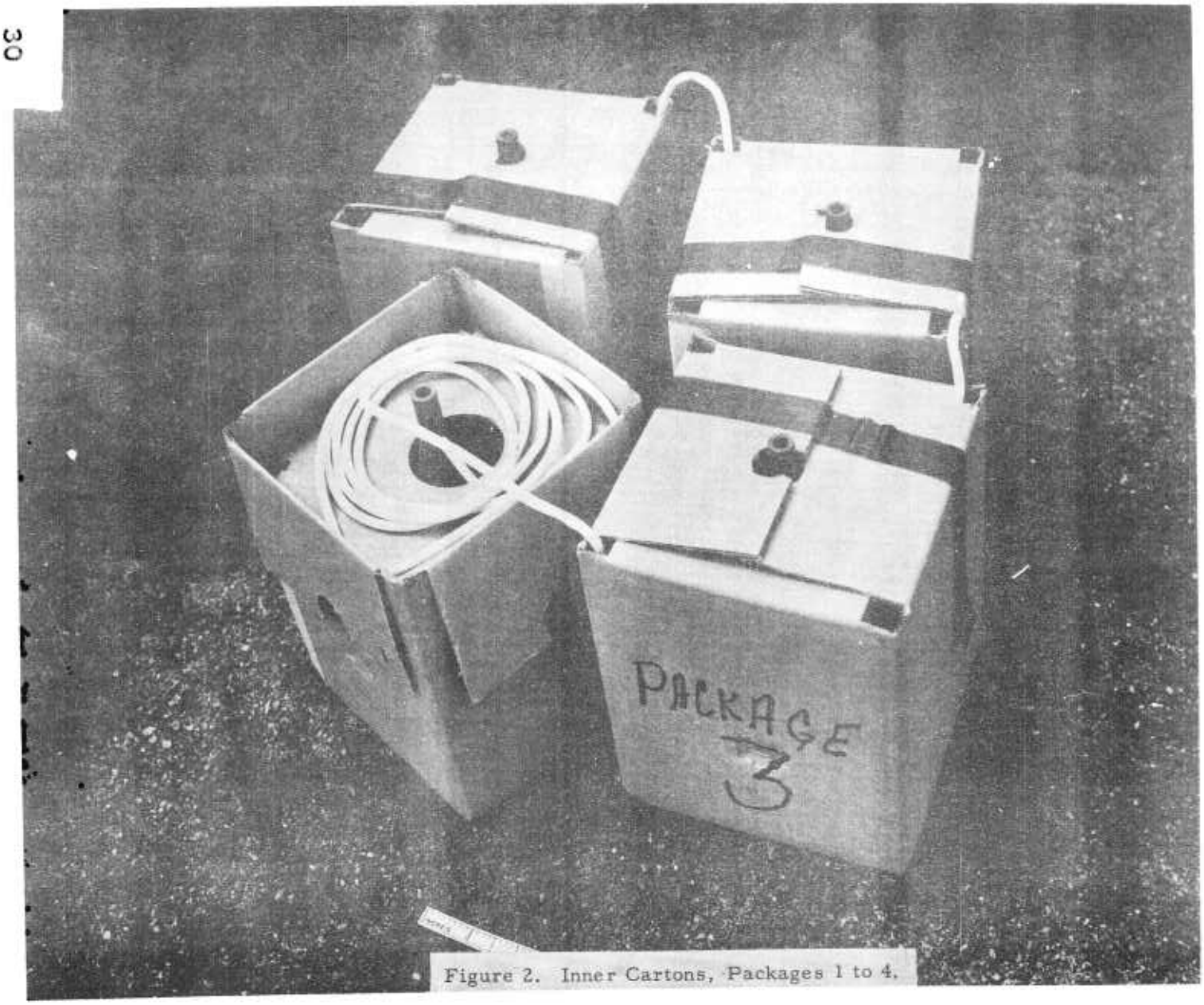


Figure 2. Inner Cartons, Packages 1 to 4.

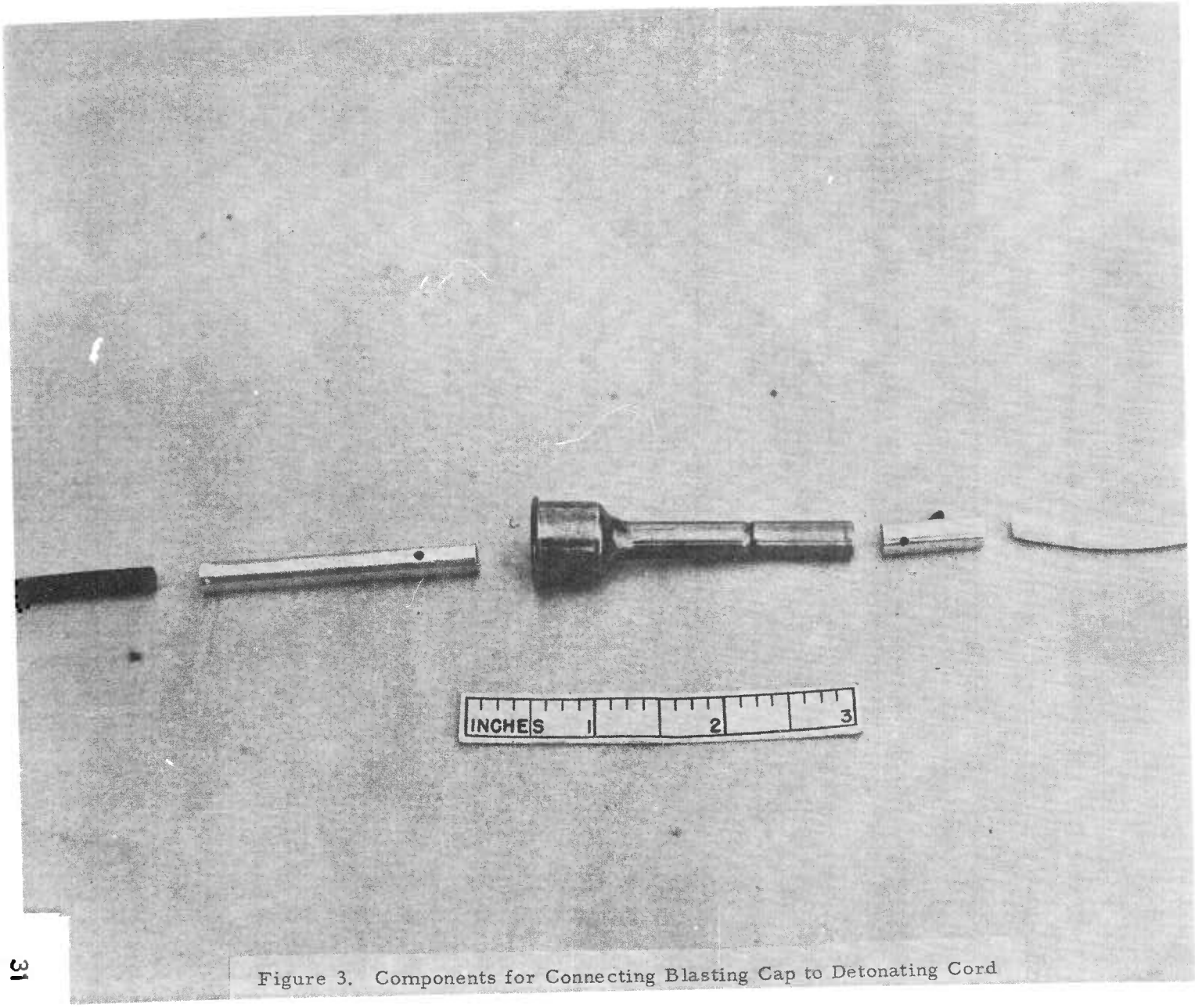


Figure 3. Components for Connecting Blasting Cap to Detonating Cord

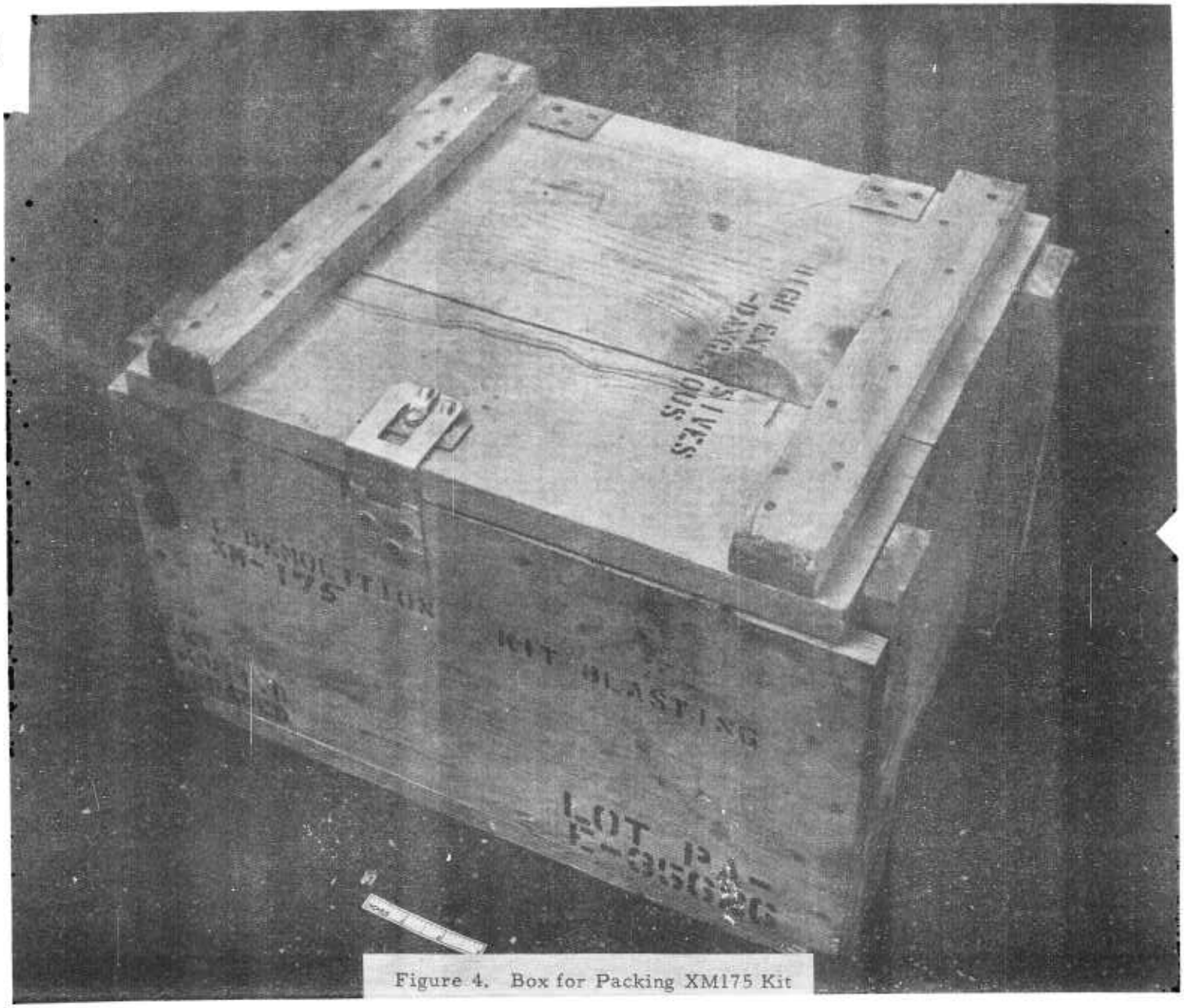


Figure 4. Box for Packing XM175 Kit

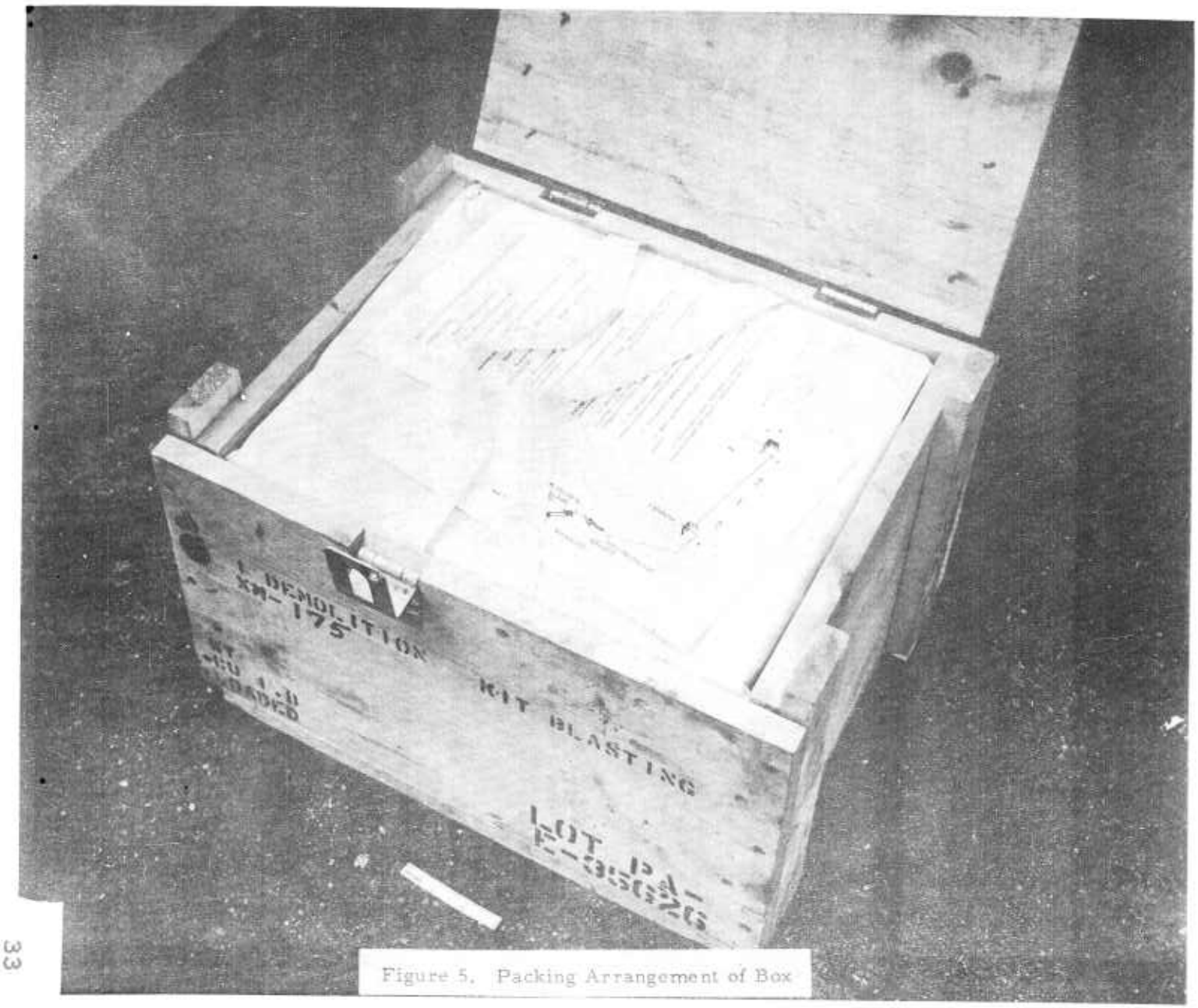


Figure 5. Packing Arrangement of Box

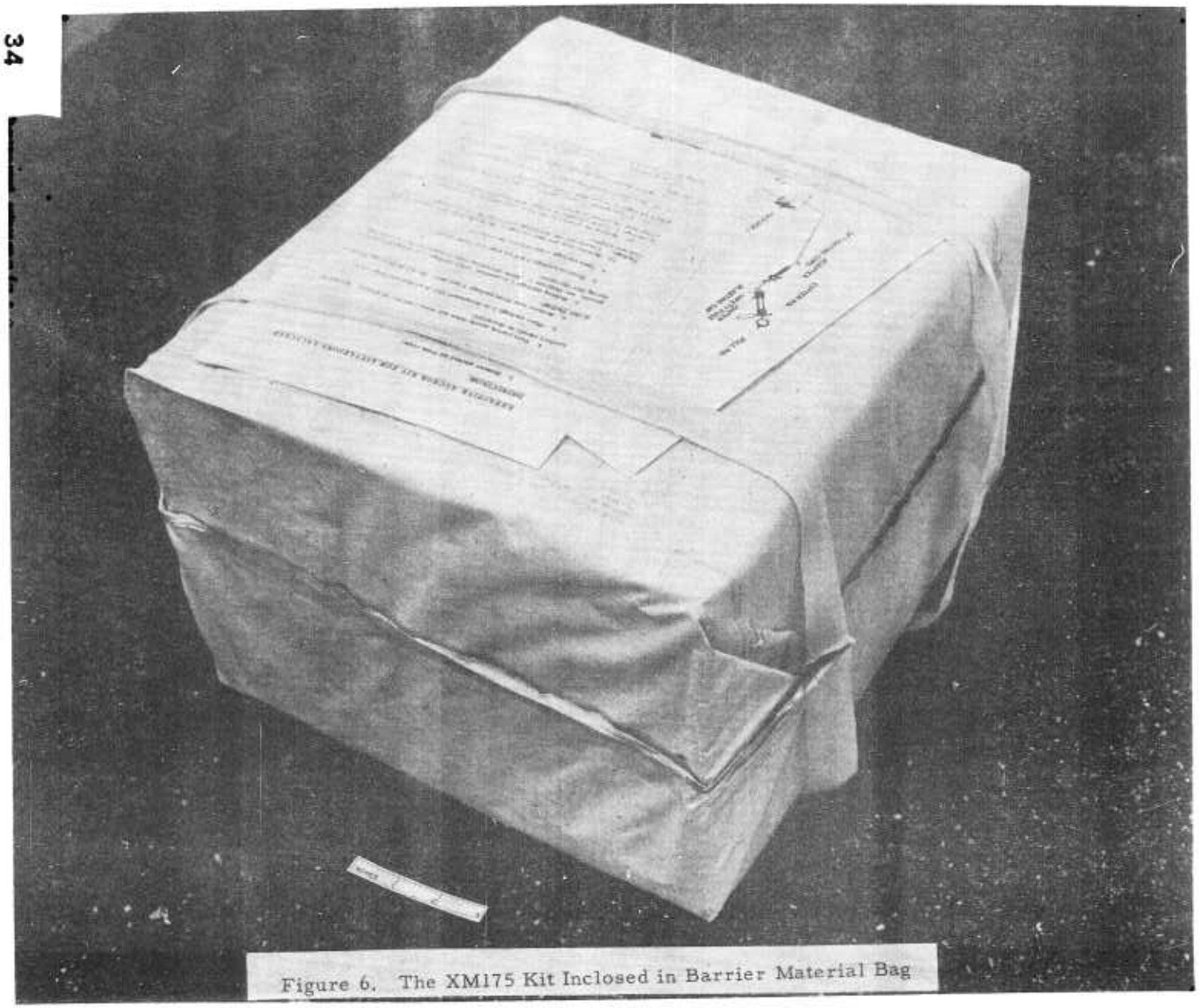


Figure 6. The XM175 Kit Inclosed in Barrier Material Bag

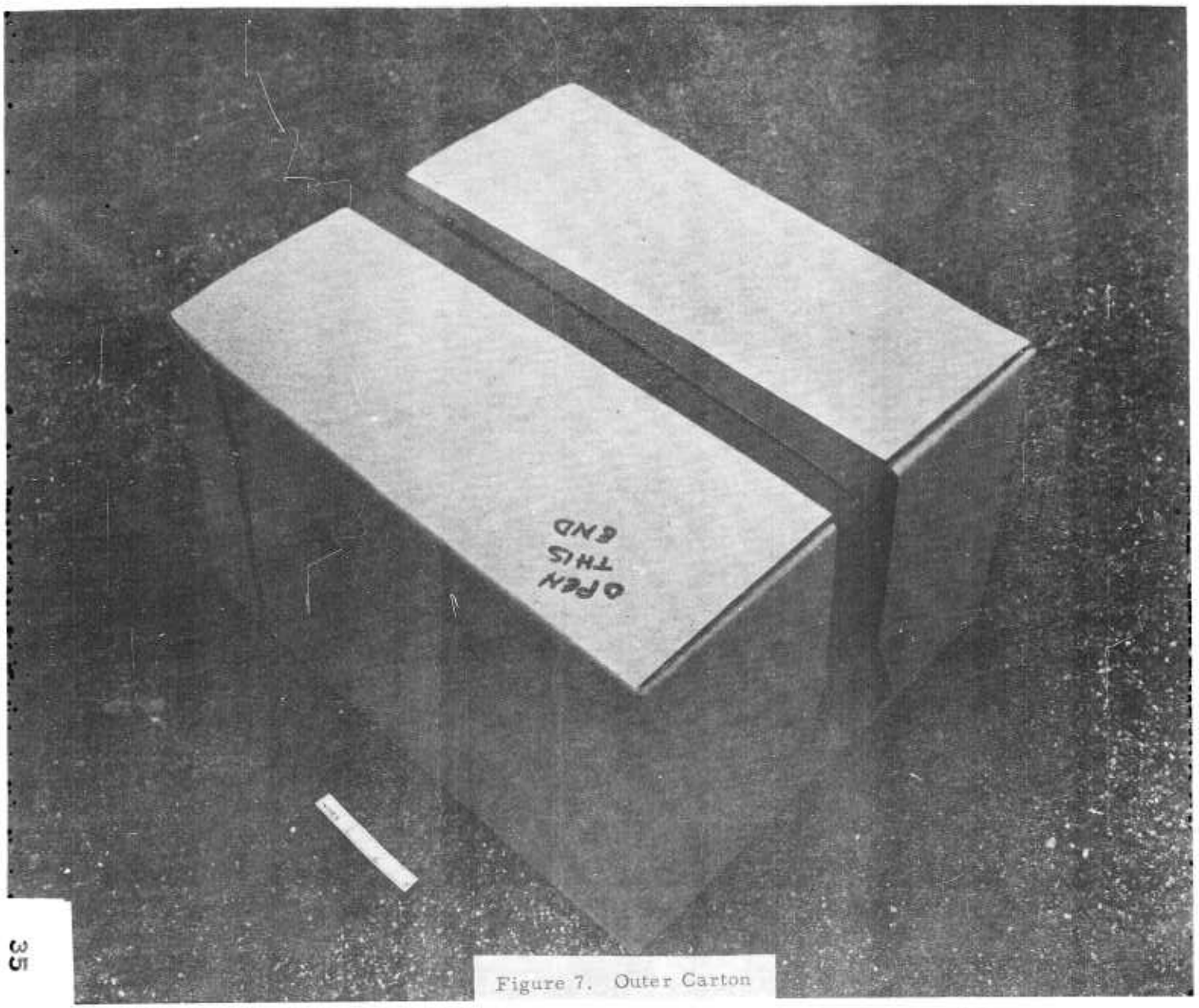


Figure 7. Outer Carton

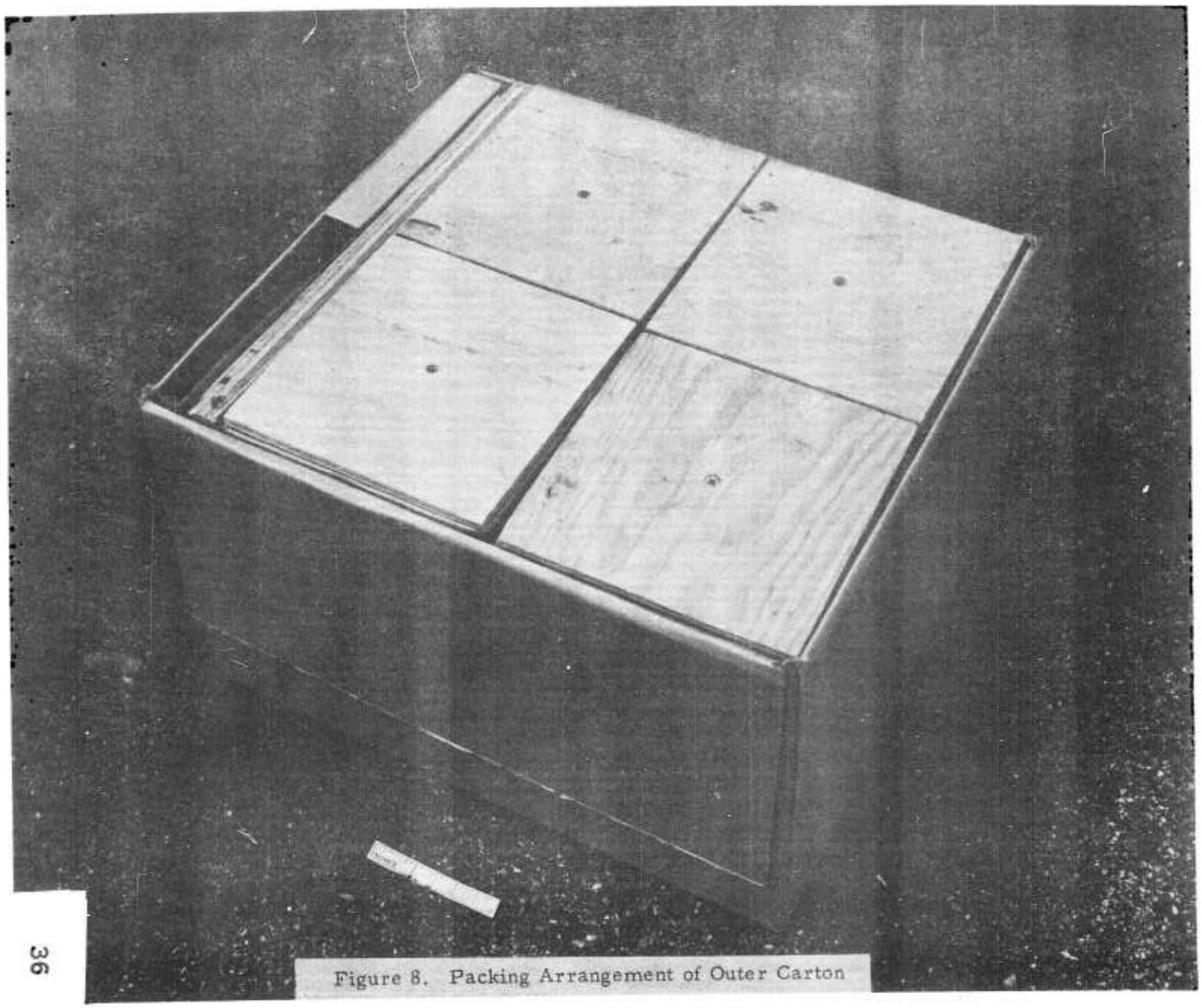


Figure 8. Packing Arrangement of Outer Carton

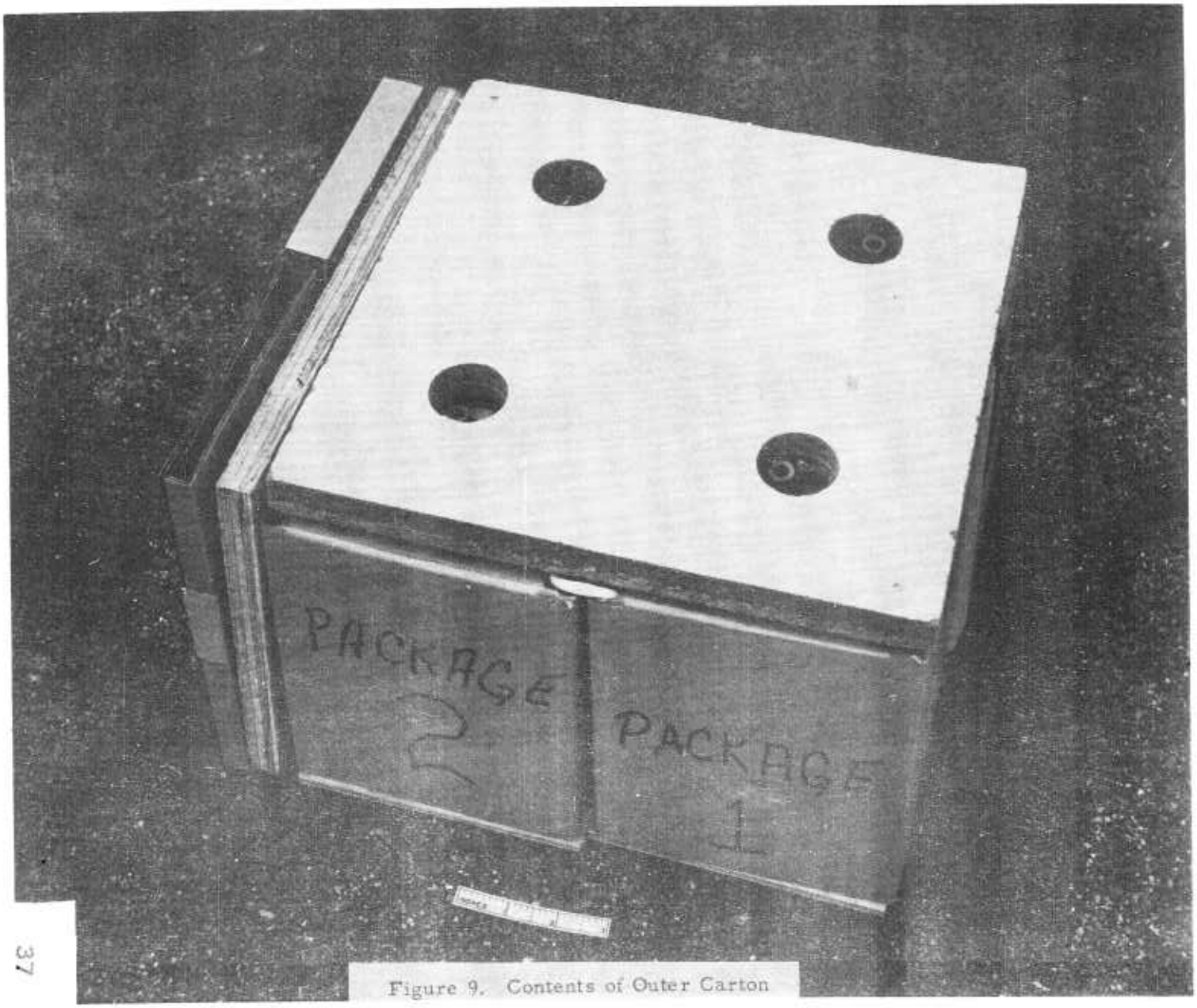


Figure 9. Contents of Outer Carton

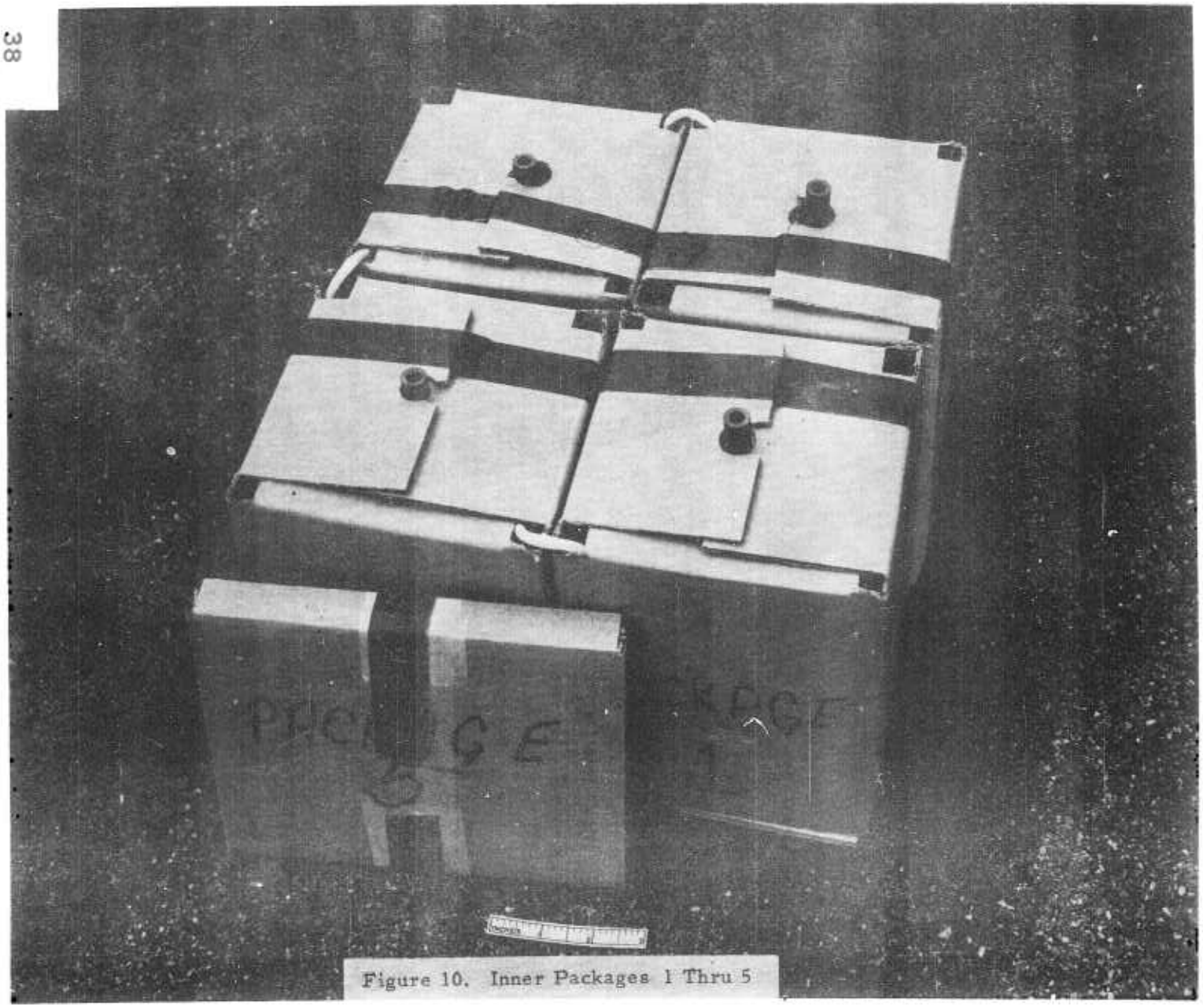
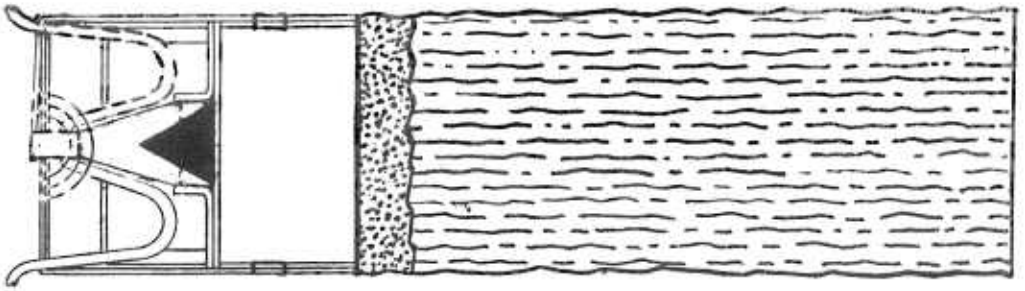


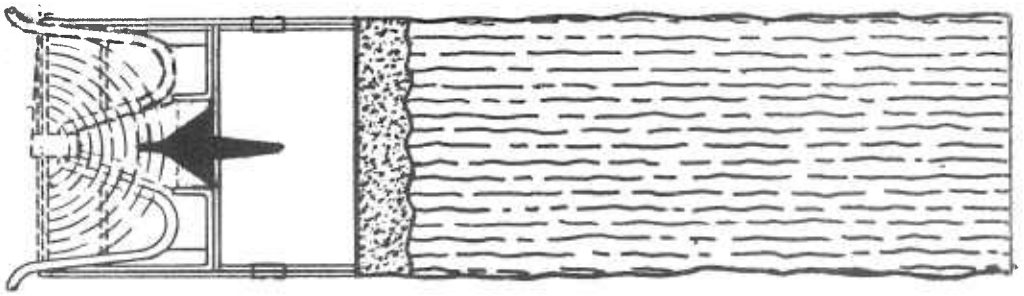
Figure 10. Inner Packages 1 Thru 5

Figure 11. Discarding Jet Spoilers

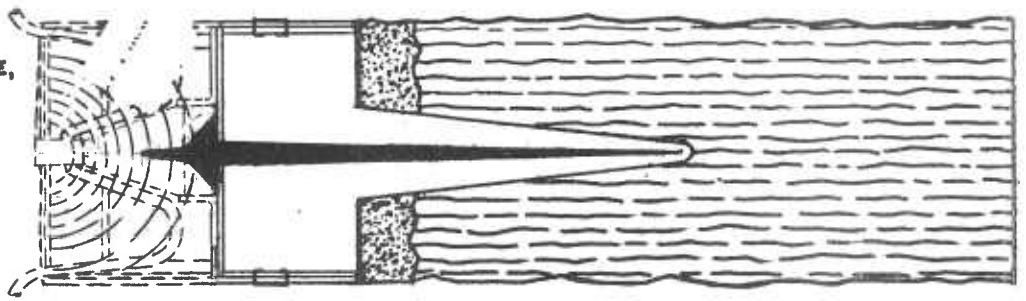
ENLARGED VIEW OF CHARGE DEMOLITION M10G AT INSTANT OF DETONATION.



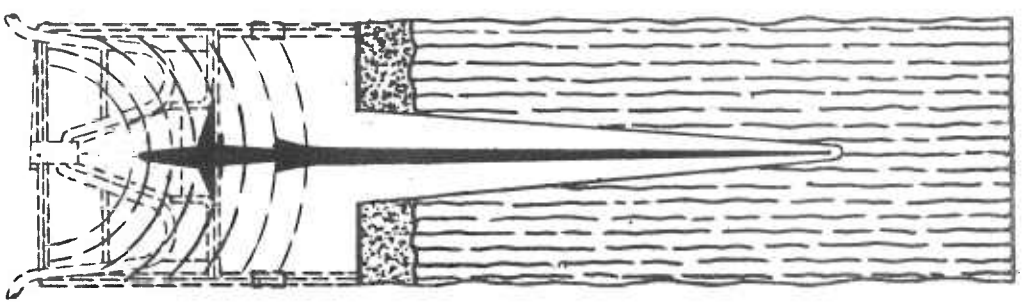
HIGH PRESSURE DEVELOPED BY EXPLOSION CAUSES CONICAL COPPER LINER TO COLLAPSE PROGRESSIVELY FROM APEX TO BASE. PLASTIC CASE, INSULATING BODY AND PACKING ARE PULVERIZED BY BLAST.



LIKE TOOTHPASTE SQUEEZED FROM A TUBE, A JET OF COPPER PARTICLES IS SQUEEZED FROM THE INNER SURFACE OF THE CONE AS IT COLLAPSES. VELOCITY OF THE INDIVIDUAL PARTICLES OF THE JET RANGE FROM 10,000 TO 30,000 FT. PER SECOND.



AS THE ENERGY OF INDIVIDUAL PARTICLES IS DISSIPATED IN PENETRATING PERMAFROST, SUCCEEDING PARTICLES CONTINUE TO PENETRATE TARGET UNTIL THE MATERIAL OF THE JET IS EXHAUSTED.



IN A MATTER OF MICROSECONDS, THE PROCESS IS COMPLETE AND A HOLE IS MADE SUITABLE FOR THE HAND DRIVING OF STAKES FOR THE LITTLE JOHN LAUNCHER.

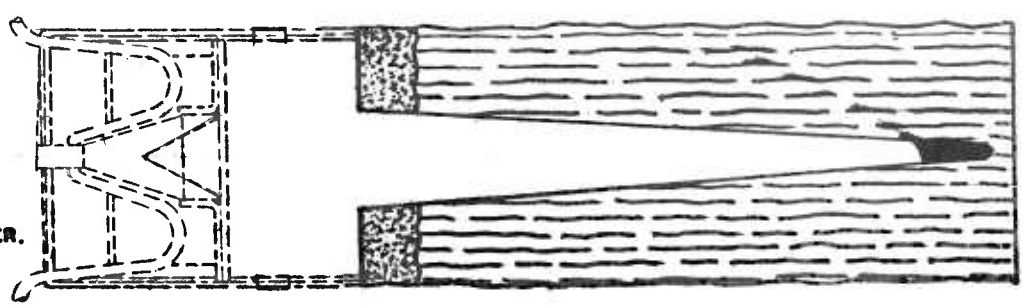


Figure 12

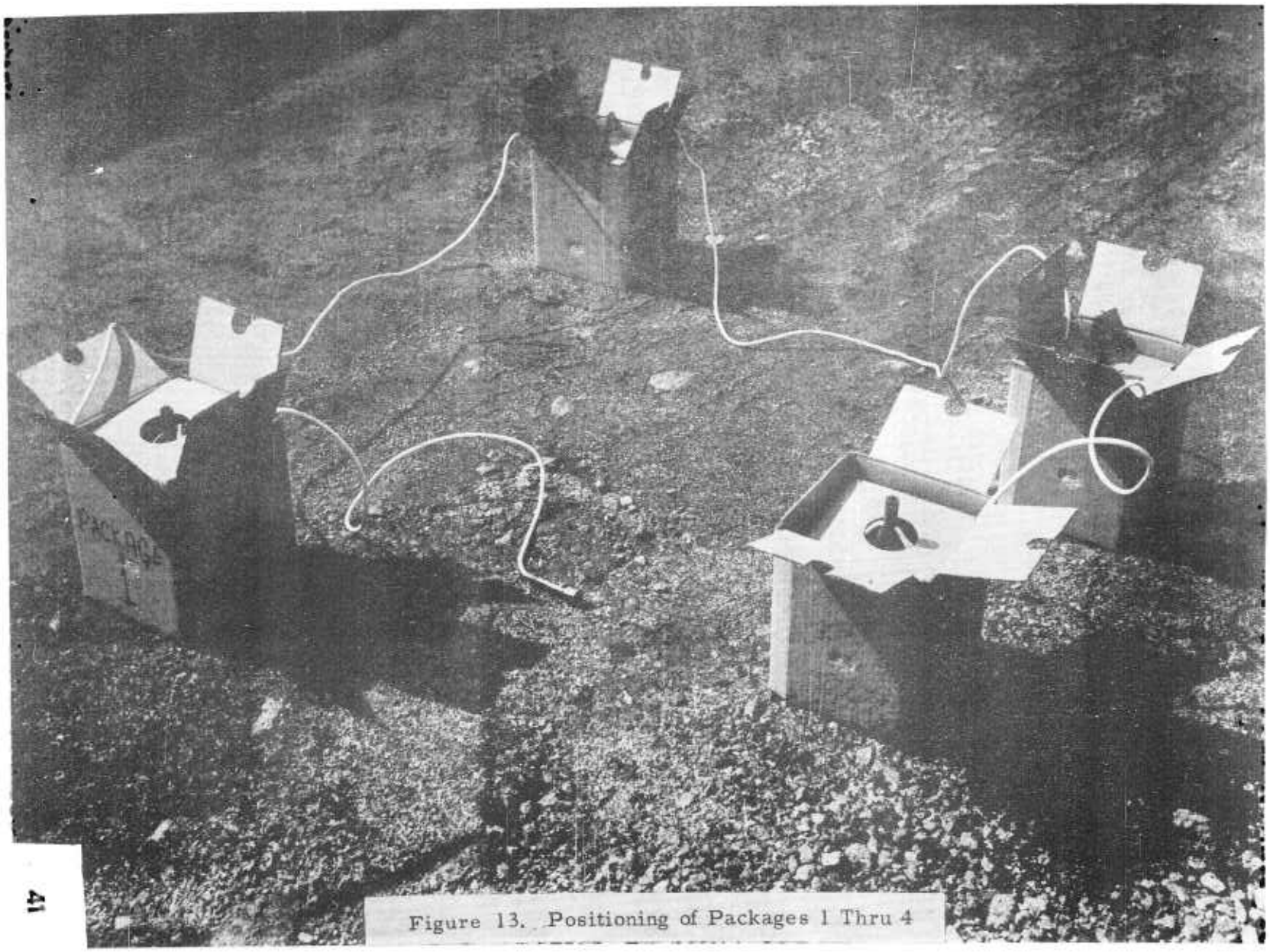


Figure 13. Positioning of Packages 1 Thru 4

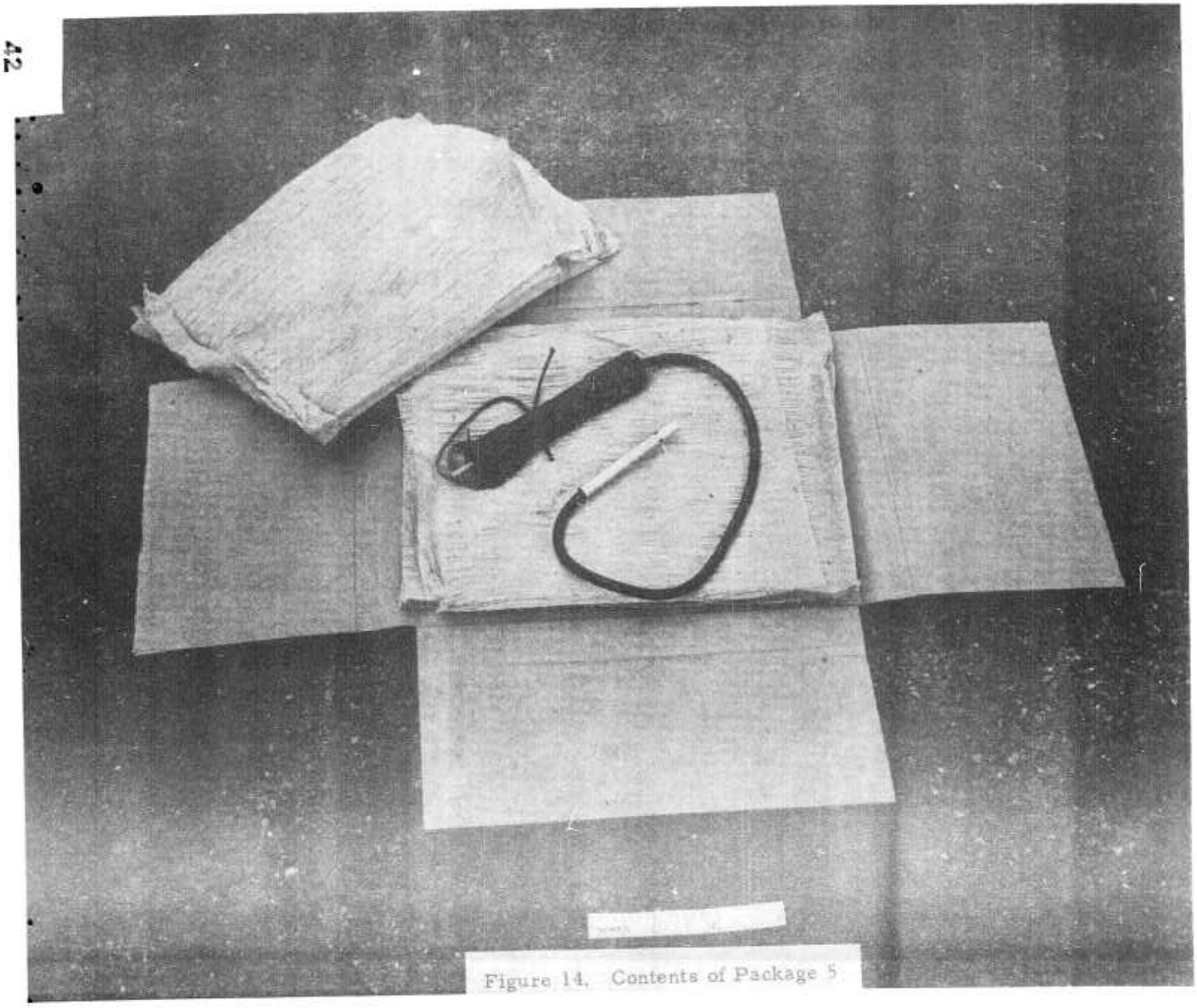


Figure 14. Contents of Package 5

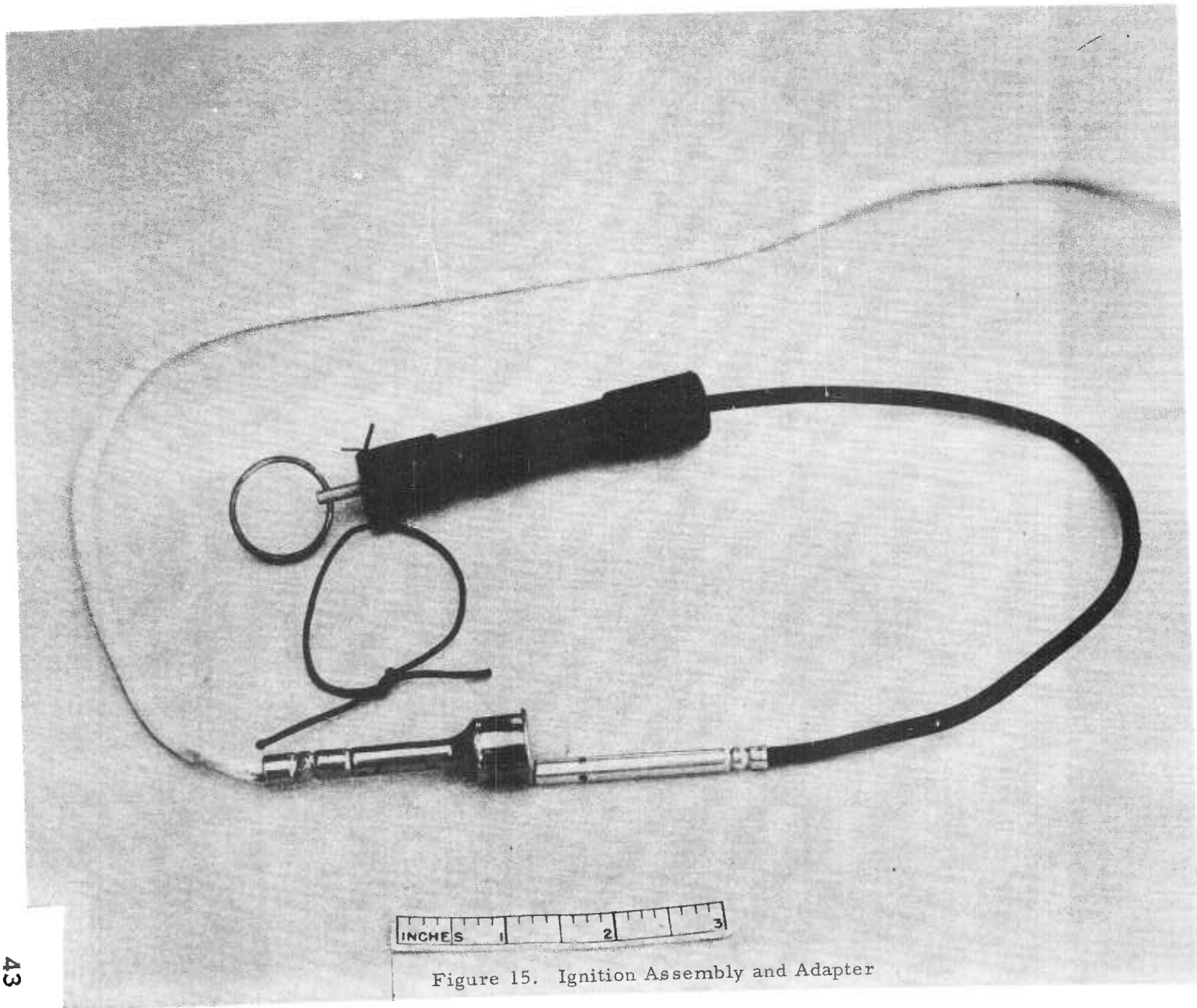


Figure 15. Ignition Assembly and Adapter

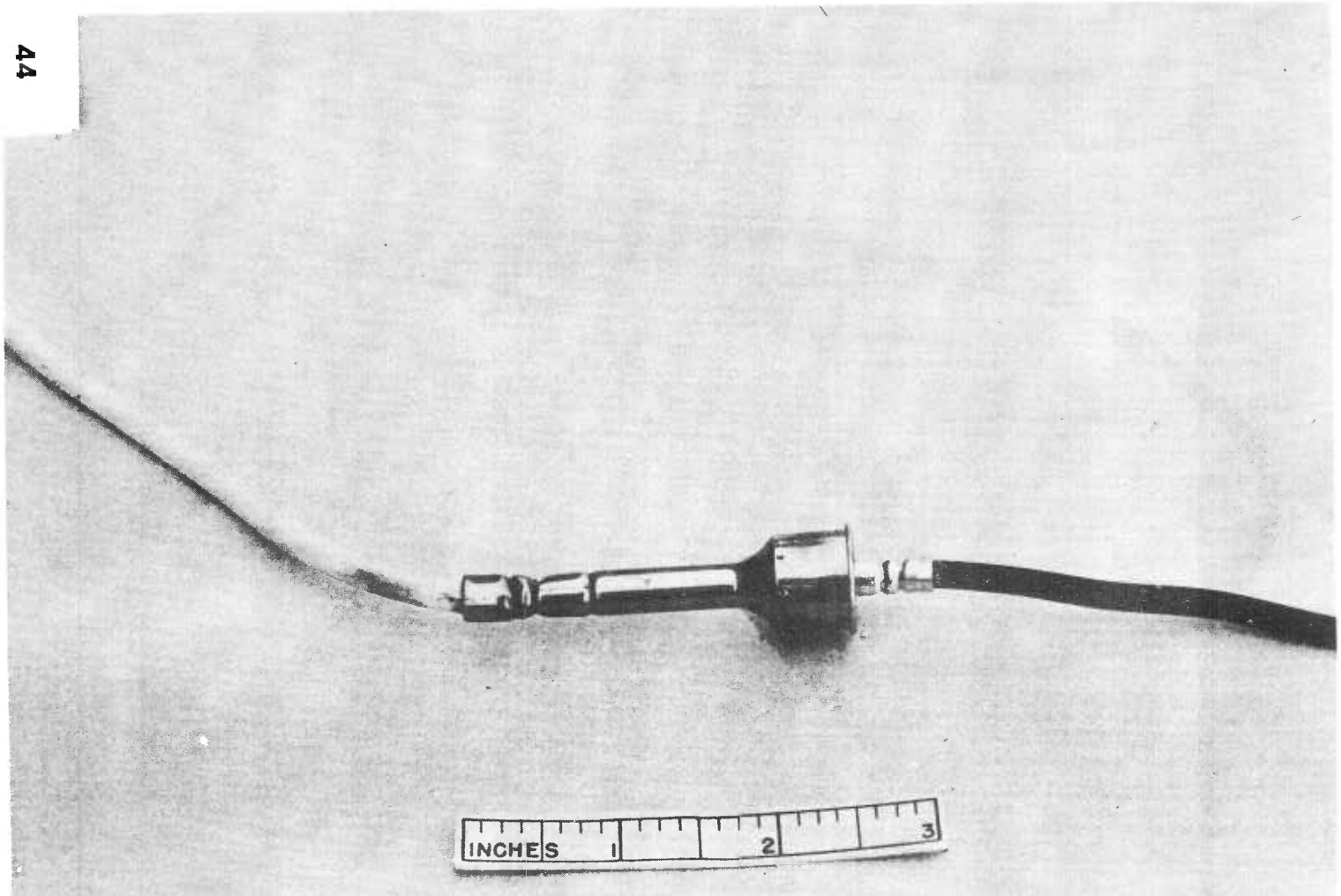


Figure 16. Blasting Cap Connected to Detonating Cord with XM38 Adapter.

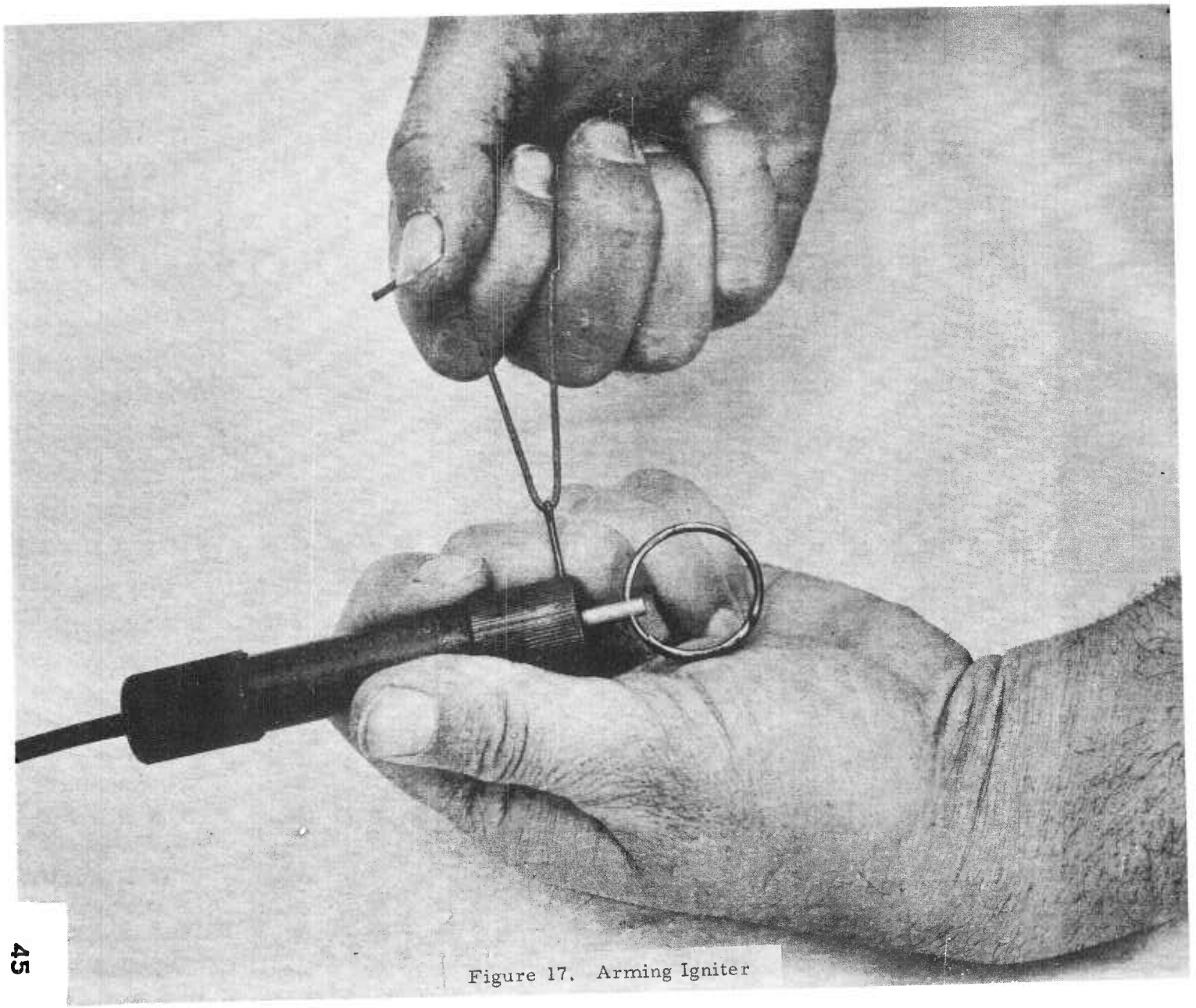
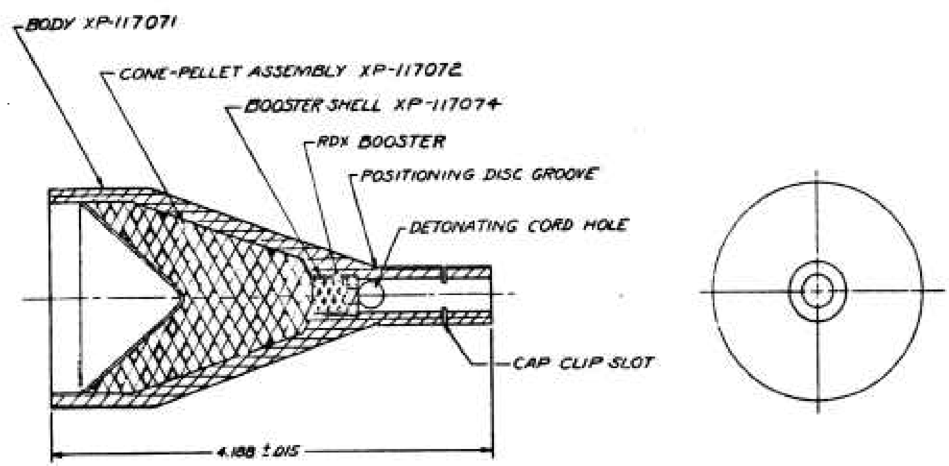


Figure 17. Arming Igniter

Figure 18. Firing Igniter

DXP-117070



NOTES:
1- SPEC MIL-A-2550 APPLIES.
2- CONE-PELLET SEATED IN BODY AT 20 PSI GAGE PRESSURE ON SEATING PRESS. BOOSTER CONTAINS APPROX. 12 GRAINS PLAIN RDX (LOADED FLUSH-1/32 IN. BELOW TOP OF SHELL.) TYPE 2, MIL-R-00398B.
3- CONE-PELLET GLUED IN BODY WITH COMPLETE RING. EDGE OF CONE 9/32 IN. ± 1/32 IN FROM END OF BODY USING CEMENT MIXTURE (SEE NOTE 4).
4- CEMENT MIXTURE: DUPONT CEMENT #4678 (SEE NOTE 5) 100 PARTS AND CAT # I-22 WHITE CALCINED INFUSORIAL EARTH POWDER (SEE NOTE 6) 15 ± 5 PARTS.
5- APPROVED SOURCE: E.I. DUPONT DE NEMOURS & CO, INC., WILMINGTON, DEL.
6- APPROVED SOURCE: FISHER SCIENTIFIC CO, 633 GREENWICH ST, NEW YORK 24, N.Y.
7- ALL SOURCES MUST SUPPLY AN ITEM EQUIVALENT TO THE MANUFACTURER'S ITEM INDICATED. ORDNANCE CORPS APPROVAL REQUIRED.

Figure 19

CHARGE DEMOLITION, SHAPED. XM-106

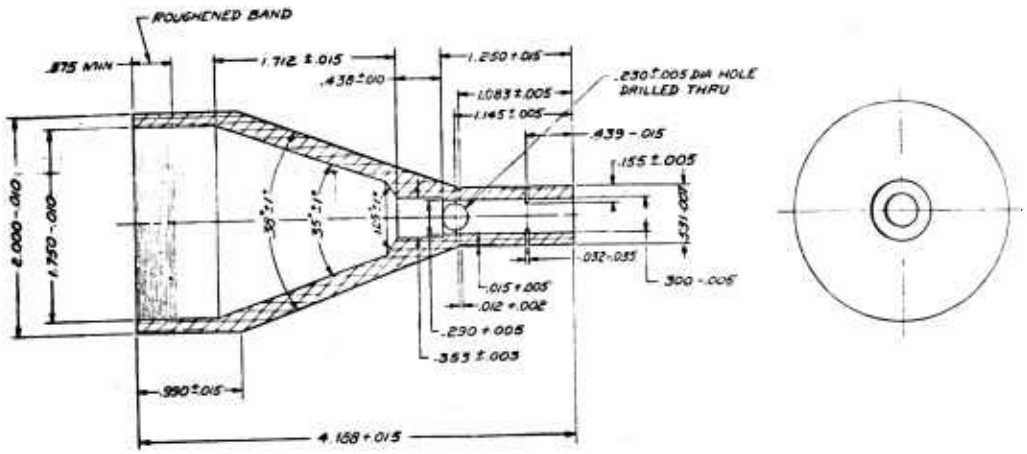
PICATINNY ARSENAL
ORDNANCE CORPS
DEPT OF THE ARMY
DOVER NEW JERSEY

D XP-117070

SCALE 2/1

A-1

DXP-117071



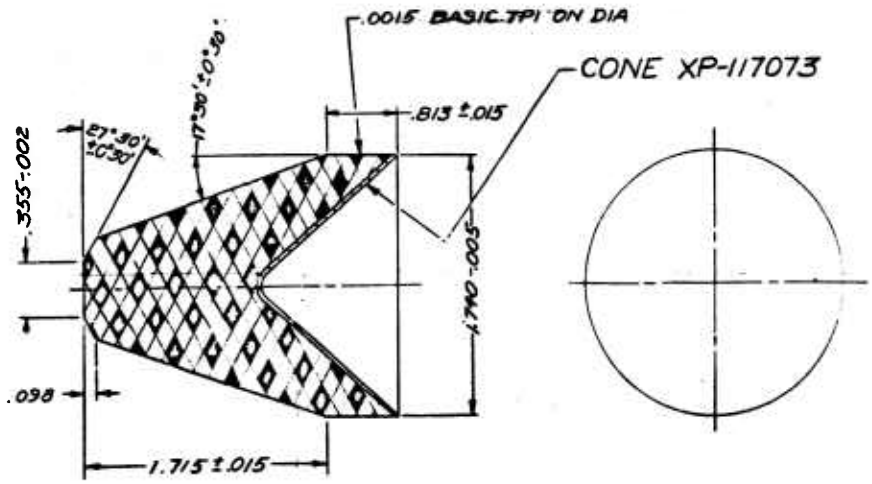
NOTES:
1 - SPEC MIL-A-2550 APPLIES
2 - MATERIAL: BAKELITE 2010, COLOR: RED NO 11105 OR 11136, FED-STD-595. (NOTE 3)
3 - APPROVED SOURCE: UNION CARBIDE PLASTICS CO., NEW YORK, N.Y. (NOTE 4)
4 - ALL SOURCES MUST SUPPLY AN ITEM EQUIVALENT TO THE MANUFACTURER'S ITEM INDICATED. ORDNANCE CORPS APPROVAL REQUIRED.

Figure 20

DXP-117070

BODY

ORDNANCE CORPS
DEPT OF THE ARMY
DOVER, NEW JERSEY
D XP-117071



NOTES:

1- SPEC MIL-A-2550 APPLIES.

2- CHARGE WEIGHT IS 72-75 GRAMS GRAPHITED 95/5 RDX/WAX

3- EXPLOSIVE MIXTURE, 95/5 RDX/WAX, ALL PERCENTAGES ARE BY WEIGHT
RDX, TYPE B ———— 95% ±1% SPEC MIL-R-00398B
WAX ———— 5% ±1% SPEC MIL-W-0020553A (ORD)
GRAPHITE, GRADE 2 ———— 1% MAX ADDED SPEC JAN-G-155

4- CONE-PELLET DIAMETER TO BE ADJUSTED TO GIVE A SLIDING FIT IN BODY AS BODY I.D. CHANGES.

5- ECCENTRICITY OF CONE-PELLET ASSEMBLY MUST NOT EXCEED 0.015 MEASURED AT THE CENTER OF THE STRAIGHT WALL SECTION. CONE-PELLET ASSEMBLY MUST BE FREE OF CRACKS AND CONE MUST ADHERE TO PELLET.

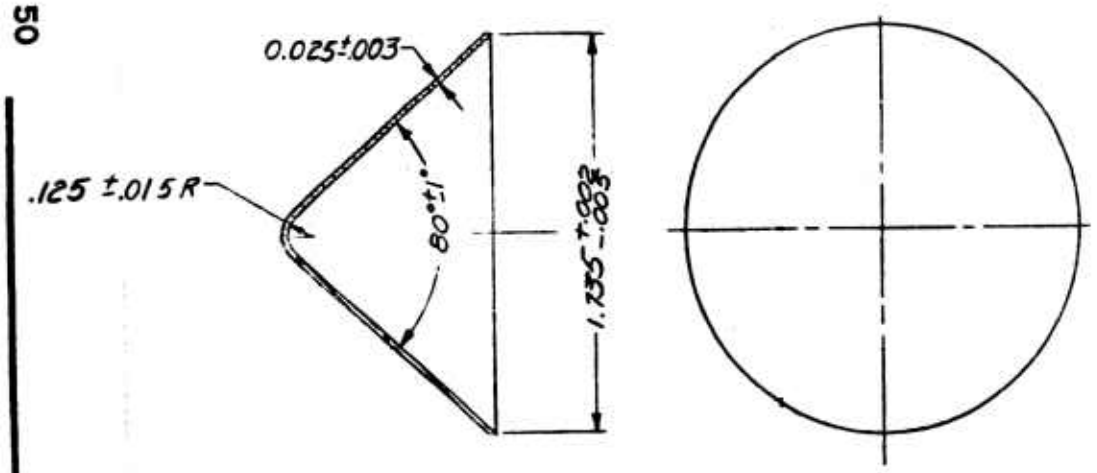
Figure 21

CONE-PELLET ASSEMBLY	PICATINNY ARSENAL ORDNANCE CORPS DEPT OF THE ARMY DOVER NEW JERSEY
XP-117070	SIZE C — XP-117072
ORIGINAL DATE OF DRAWING JAN 11 1943	SCALE — UNIT WT — SHEET — OF

BXP-117073

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

05



NOTES:
1- SPEC MIL-A-2550 APPLIES
2- MATERIAL: ELECTROLYTIC COPPER, SPEC QQ-C-576, TOUGH PITCH

Figure 22

		PHYSICAL PROPERTIES		UNLESS OTHERWISE SPECIFIED	ORIGINAL DATE OF DRAWING JAN 11,1962	CONE	PICATINNY ARSENAL ORDNANCE CORPS DEPT OF THE ARMY DOVER N.J.
		YP		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES	DRAFTSMAN SB CHECKER		
		TS			TRACER CHECKER		
		EL 2		MATERIAL NOTE 2	ENGR ENGR		
		RA			SUBMITTED ORD CORPS		
CXP-117072		BH		HEAT TREATMENT			
NEXT ASSY	USED ON				APPROVED BY ORDER OF THE CHIEF OF ORDNANCE ORD CORPS		
APPLICATION		RH		FINAL PROTECTIVE FINISH		SCALE 2/1 UNIT WT	DWG SIZE B XP-117073
DO NOT DO	APPLY PART NO AS SPECIFIED						

BXP-117074

DD Form 1376-1
1 Oct 54

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

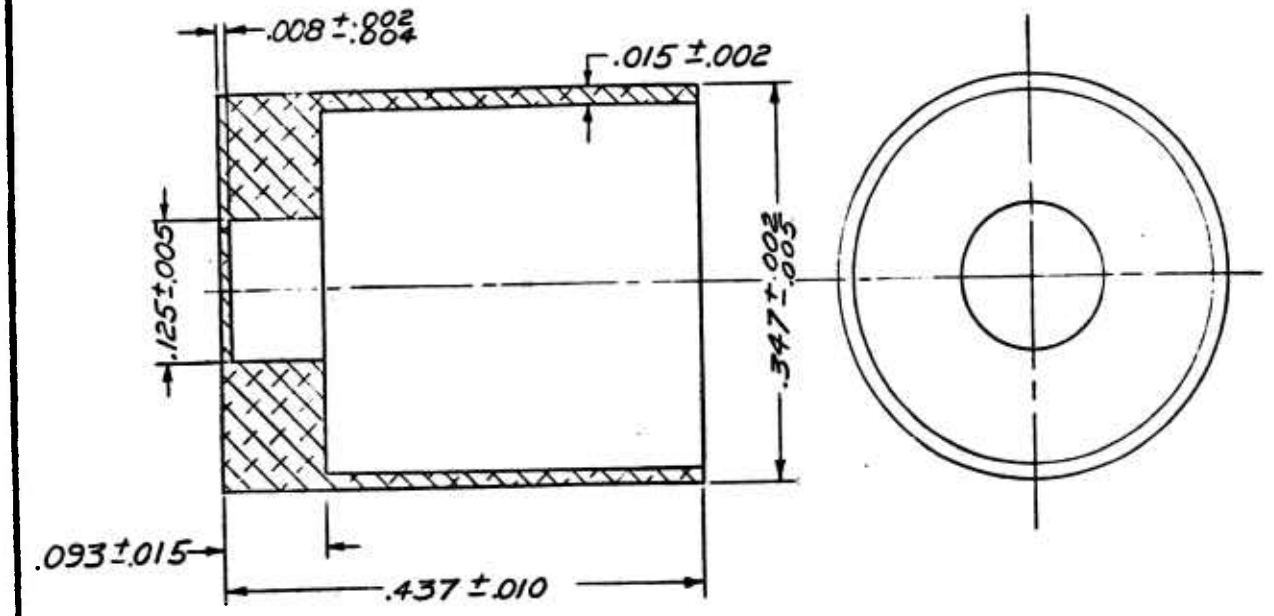


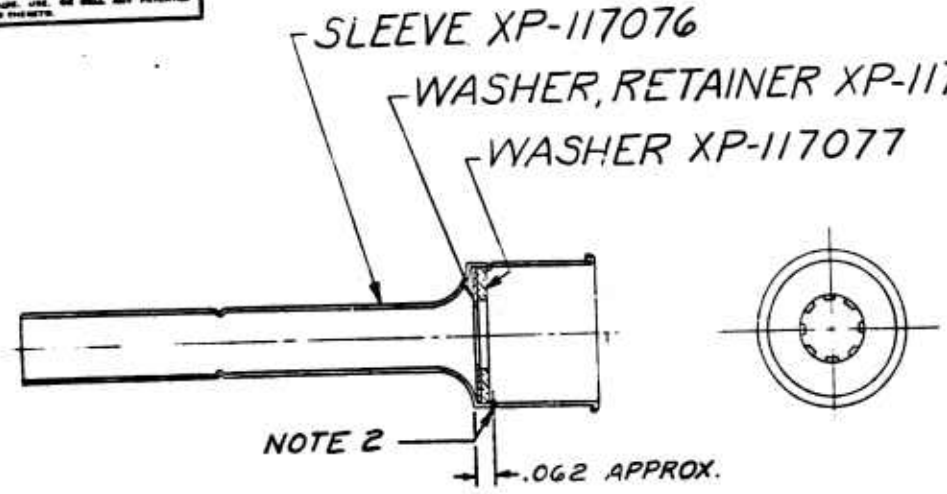
Figure 23

NOTES:
1-SPEC MIL-A-2550 APPLIES.
2-MATERIAL: ALUMINUM ALLOY, SHEET, TEMPER O, SPEC. QQ-A-318 OR QQ-A-359.

		PHYSICAL PROPERTIES		UNLESS OTHERWISE SPECIFIED	ORIGINAL DATE OF DRAWING JAN 11, 1962	BOOSTER SHELL	PICATINNY ARSENAL ORDNANCE CORPS DEPT OF THE ARMY DOVER, NEW JERSEY
		YP		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES	DRAFTSMAN CHECKER		
		TS			TRACER CHECKER		
		EL 2		MATERIAL SEE NOTE 2	ENGR ENGR		
		RA			SUBMITTED W. R. Sooter ORD CORPS		
BXP-117070		BN		HEAT TREATMENT			DWG SIZE B — XP-117074
NEXT ASSY	USED ON						
APPLICATION		RN		FINAL PROTECTIVE FINISH	APPROVED BY ORDER OF THE CHIEF OF ORDNANCE ORD CORPS	SCALE 10/1 UNIT WT	SHEET OF
DO NOT DO	APPLY PART NO AS SPECIFIED						

BXP-117075

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



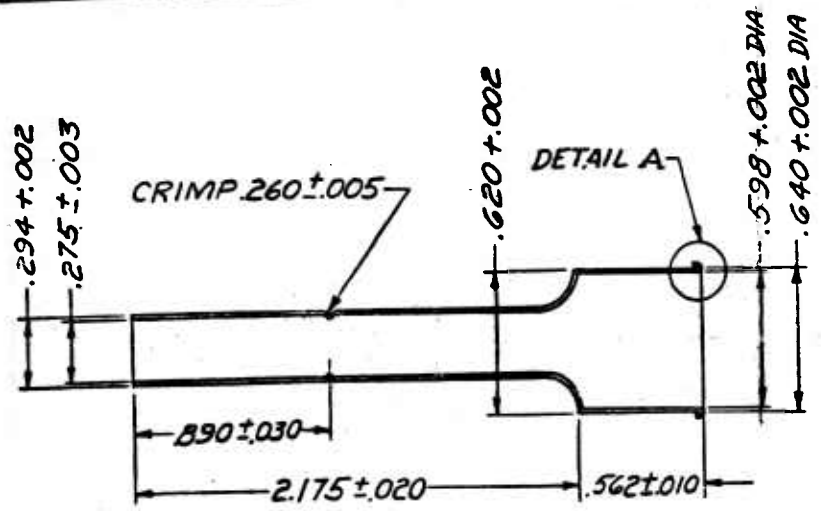
NOTES:
1 - SPEC MIL-A-2550 APPLIES.
2 - 8 STAKE CRIMPS AT 45° SPACINGS - DEPTH OF .010" TO .012". CRIMPS SHOULD SECURE WASHER AND RETAINER FIRMLY IN PLACE.

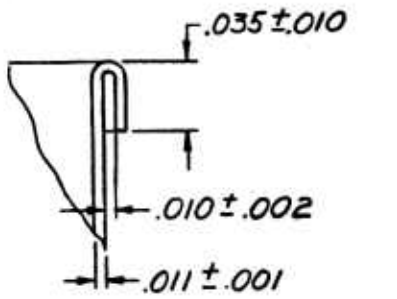
Figure 24

NEXT ASSY	USED ON	PHYSICAL PROPERTIES	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES	ORIGINAL DATE OF DRAWING FEB 13,1962	ADAPTER, BLASTING CAP TO DETONATING CORD, XM-38	PICATINNY ARSENAL ORDNANCE CORPS DEPT OF THE ARMY DOVER, NEW JERSEY	
APPLICATION		YP		DRAFTSMAN JB CHECKER		SIZE B	XP-117075
DO NOT DO	APPLY PER SPEC AS SPECIFIED	TS		TRACER CHECKER			
		EL 2	MATERIAL	APPROVED ENGR			
		RA		SUBMITTED			
		BH	HEAT TREATMENT	ORD CORPS			
		RH		APPROVED BY ORDER OF THE CHIEF OF ORDNANCE			
			FINAL PROTECTIVE FINISH	ORD CORPS	SCALE 2/1 UNIT WT		SHEET OF

BXP-117076

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL





DETAIL A (SCALE 10/1)

NOTES:

1 - SPEC MIL-A-2550 APPLIES.

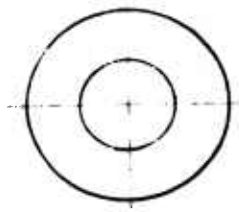
2 - MATERIAL: GILDING METAL (90/10 BRASS) DRAWING ANNEAL, SPEC JAN-G-383

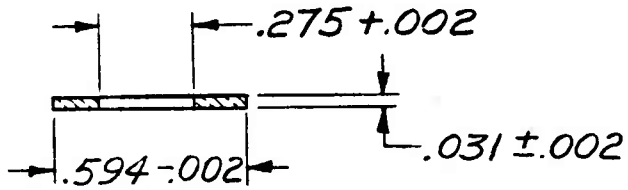
Figure 25

		PHYSICAL PROPERTIES	UNLESS OTHERWISE SPECIFIED	ORIGINAL DATE OF DRAWING FEB 12 1962	SLEEVE	PICATINNY ARSENAL
		YP	DIMENSIONS ARE IN INCHES	DRAFTSMAN SB CHECKER		ORDNANCE CORPS
		TS	TOLERANCES ON FRACTIONS DECIMALS ANGLES	TRACER CHECKER		DEPT OF THE ARMY
		EL 2		ENGR ENGR		DOVER, NEW JERSEY
		RA	MATERIAL SEE NOTE 2	SUBMITTED ORD CORPS		DWG SIZE B — XP-117076
BXP-117075		BH	HEAT TREATMENT	APPROVED BY ORDER OF THE CHIEF OF ORDNANCE ORD CORPS		SHEET
NEXT ASSY	USED ON	RH	FINAL PROTECTIVE FINISH	SCALE 2/1	UNIT WT	
APPLICATION						
DO NOT DO	APPLY PART NO AS SPECIFIED					

O O FORM 8 AUG 48 ORDIP 1181-1

PHYSICAL PROPERTIES		APPLICATION		A XP-117077
YP		NEXT ASSY	USED ON	REVISIONS
TS		BXP-117075		SYM / DESCRIPTION / DATE / APPROVAL
EL2				
RA				
BH				
RH		DO NOT	APPLY PART NO.	
		DO	AS SPECIFIED	





NOTES:
1 - SPEC MIL-A-2550 APPLIES
2 - MATERIAL: GILDING METAL (90/10 BRASS), COLD ROLLED, SPEC JAN-G-383.

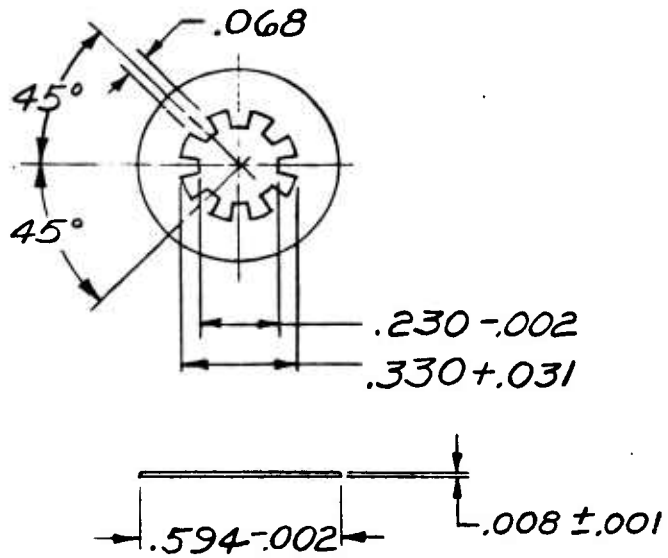
Figure 26

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON- DECIMALS FRACTIONS ANGLES	ORIGINAL DATE OF DRAWING FEB 12, 1962	WASHER	PICATINNY ARSENAL ORDNANCE CORPS DEPT OF THE ARMY DOVER, NEW JERSEY
MATERIAL SEE NOTE 2	DRAFTSMAN SB / CHECKER		DWG SIZE A / XP-117077
HEAT TREATMENT	TRACER / CHECKER		SHEET OF
FINAL PROTECTIVE FINISH	ENGR / ENGR		
	SUBMITTED ORD CORPS		
	APPROVED BY ORDER OF THE CHIEF OF ORDNANCE ORD CORPS	SCALE 2/1 UNIT WT	

A-8

O O FORM 8 AUG 48 ORDIP 1181-1

PHYSICAL PROPERTIES		APPLICATION		AXP-117078			
YP		NEXT ASSY	USED ON				
TS		BXP-117075		REVISIONS			
EL2				SYM	DESCRIPTION	DATE	APPROVAL
RA							
BH							
RH		DO NOT	APPLY PART NO.				
		DO	AS SPECIFIED				



NOTES:

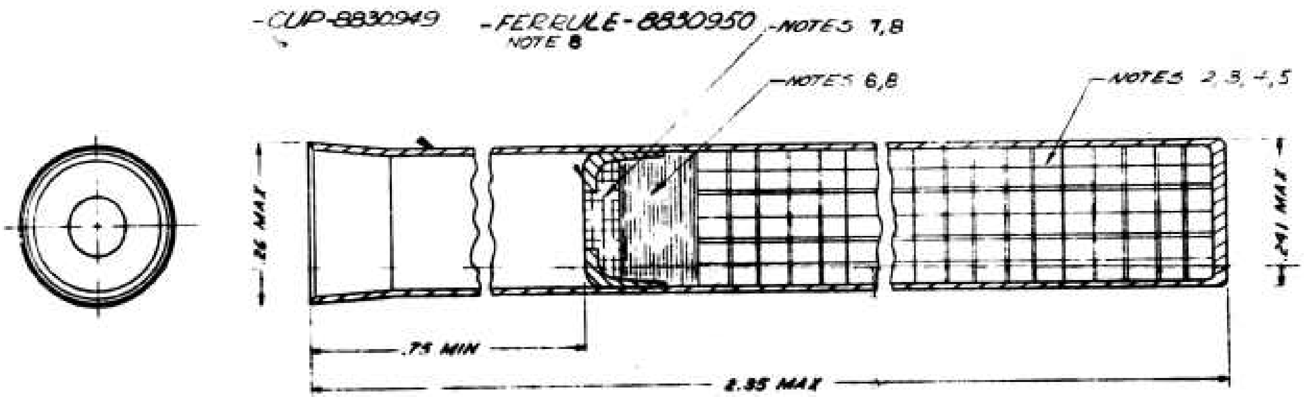
1 - SPEC MIL-A-2550 APPLIES

2 - MATERIAL: BRASS SPEC QQ-B-613a TEMPER SPRING COMPOSITION

Figure 27

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: DECIMALS FRACTIONS ANGLES	ORIGINAL DATE OF DRAWING FEB 12, 1962	WASHER, RETAINER	PICATINNY ARSENAL ORDNANCE CORPS DEPT OF THE ARMY DOVER, NEW JERSEY
MATERIAL	DRAFTSMAN JB / CHECKER; TRACER / CHECKER; ENGR / ENGR		
HEAT TREATMENT	SUBMITTED ORD CORPS		DWG SIZE A — XP-117078
FINAL PROTECTIVE FINISH	APPROVED BY ORDER OF THE CHIEF OF ORDNANCE ORD CORPS	SCALE 2/1 UNIT WT	SHEET OF

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	EOPA-4682	9-20-60	



NOTES:-

1- SPEC MIL-G-2550 APPLIES.
2- CHARGE, BASE: 14.5 - 2.0 GR. (943-130 MG) RDX, TYPE A OR B, CLASS C, SPEC MIL-R-398.
3- ALTERNATIVE GRANULATION OF RDX MAY BE AS FOLLOWS THROUGH U.S. STANDARD SIEVES, SPEC RR-S-366 :-

SIEVE NO.	% PASSING
18	100 %
70	15 % MAX
100	3 % MAX

4- BASE CHARGE (RDX) IS PRESSED INTO THE CUP IN FOUR (4) INCREMENTS AT A PRESSURE BETWEEN 5000 AND 6000 PSI.
5- RDX MAY BE IN PELLET FORM; PELLETS TO BE MANUFACTURED IN ACCORDANCE WITH SPEC X-PA-PD-680, TYPE I OR II. RDX MAY BE TREATED WITH AN AMINE SALT OF SATURATED LONG CHAIN ALCOHOL SULPHATE (DUPONOL G) AND GRAPHITE TO IMPROVE PROCESSING.
6- CHARGE INTERMEDIATE :- 3.7 GR. (240 MG). ADVISORY:- 3.5 GR. (208 MG) MIN., LEAD AZIDE, TYPE I, SPEC PA-PD-1217. LEAD AZIDE MAY BE TREATED WITH ½ % CALCIUM STEARATE SPEC. JAN-C-263.
7- CHARGE, IGNITION:- .35 GR (26 MG). ADVISORY:- .45 GR (30 MG) MIN, NORMAL LEAD STYPHNATE SPEC PA-PD-680 MAY BE TREATED WITH ½ % GRAPHITE AND ½ % CALCIUM STEARATE, SPEC JAN-C-263, TO IMPROVE PROCESSING.
8- ASSEMBLE CHARGES AND FERRULE IN ORDER SHOWN, THEN CONSOLIDATE AT A PRESSURE BETWEEN 5000 AND 6030 PSI.

(A) [redacted]

FOR LIST OF PARTS, SEE ENGINEERING PARTS LIST E 30941

(A) ORDNANCE PART NO. 8830948

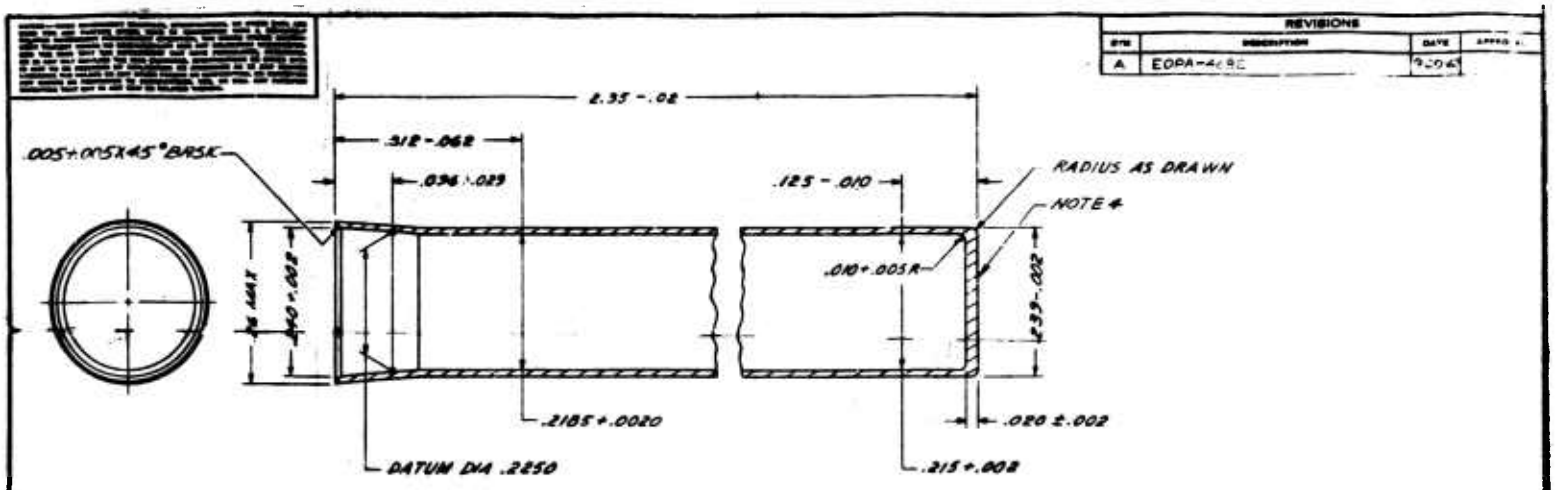
CAP, BLASTING, NON-ELECTRIC, M7 ASSEMBLY

PICATINNY ARSENAL
ORDNANCE CORPS
DEPT OF THE ARMY
DOVER, NEW JERSEY

C 8830948

Figure 28

A-10



NOTES:
1- SPEC MIL-G-2550, MIL-STD-8, DWG 301-7. AND MIL-STD-10 APPLY.
2- MATERIAL:- ALUMINUM, ALLOY, SHEET, TEMPER O SPEC QQ-A-318.
3- FINISH ALL OVER 125/.
4- .01 MAX. CONCAVITY PERMITTED.

Figure 29

Ⓐ

ORDNANCE PART NO. 8830949

		PHYSICAL PROPERTIES
		TP
	CAP, BLASTING	TS
C8830948	MIN-ALEC, M7	EL. E
SEE ENGINEERING RECORDS		RA
NEXT ASSY	USED ON	BH
APPLICATION		RH
DO NOT APPLY PART NO.		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES

MATERIAL SEE NOTE 2

HEAT TREATMENT

FINAL PROTECTIVE FINISH

ORIGINAL DATE OF DRAWING APRIL 1, 1960

DRAWN

TRACED

CHECKED

SUBMITTED

APPROVED BY ORDER OF THE CHIEF OF ORDNANCE

CUP

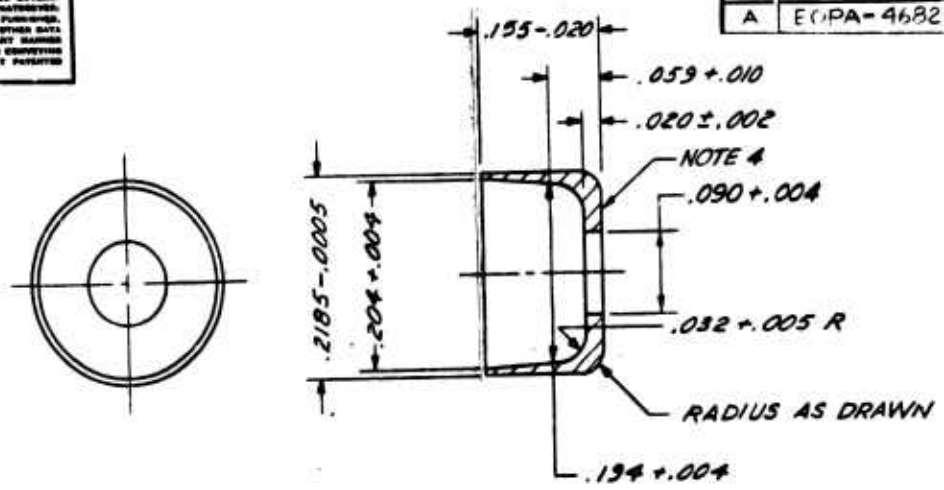
SCALE 4 UNIT WT

PICATINNY ARSENAL
ORDNANCE CORPS
DEPT OF THE ARMY
DOVER, NEW JERSEY

DWG SIZE C | 8830943

8883032

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	ECPA-4682	9-2-60	



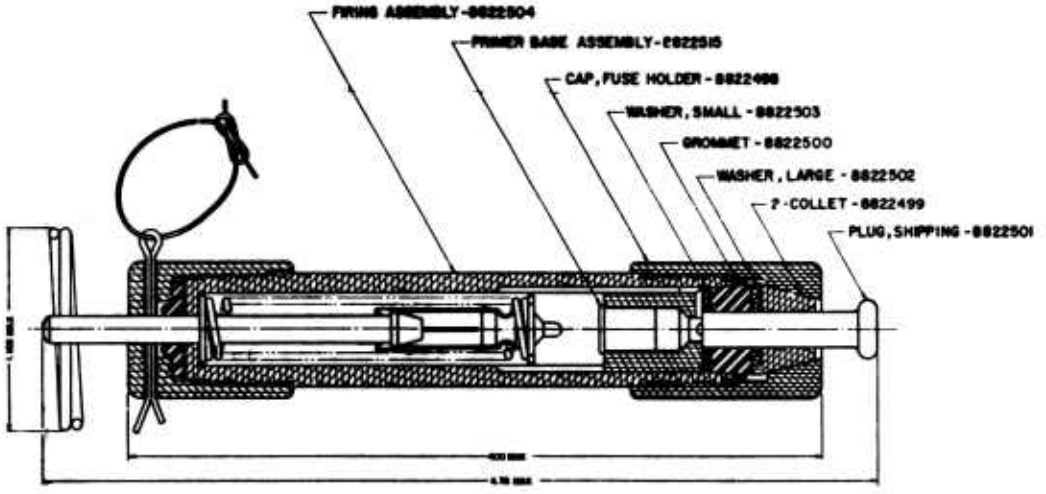
NOTES:-
1- SPEC MIL-G-2550, MIL-STD-10 AND MIL-STD-8 APPLY.
2- MATERIAL:- ALUMINUM ALLOY, SHEET, TEMPER O, SPEC QQ-A-318.
3- FINISH ALL OVER 125/.
4- .01 MAX CONCAVITY PERMITTED.

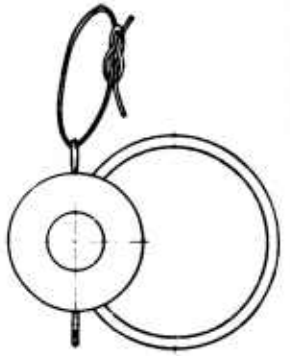
Figure 30

(A)

ORDNANCE PART NO. 8830950

		PHYSICAL PROPERTIES	UNLESS OTHERWISE SPECIFIED	ORIGINAL DATE OF DRAWING APRIL 1, 1960		PICATINNY ARSENAL
		TP	DIMENSIONS ARE IN INCHES	DESIGNED J.J.	CHECKED	ORDNANCE CORPS
	CAP BLASTING	TS	TOLERANCES ON FRACTIONS DECIMALS ANGLES	TRACED	CHECKED	DEPT OF THE ARMY
C8830948	NON-ELECT	EL E	MATERIAL SEE NOTE 2	WEIGHT	CHECKED	DOVER, NEW JERSEY
SEE ENGINEERING RECORDS		RA	HEAT TREATMENT	SUBMITTED [signature] ORD CORPS		DWG SIZE B — 8830950
NEXT ASSY	USED ON	BH		APPROVED BY ORDER OF THE CHIEF OF ORDNANCE [signature] ORD CORPS	FERRULE	SHEET OF
APPLICATION		RH	FINAL PROTECTIVE FINISH	SCALE 4	UNIT WT	A-12
DO NOT	APPLY PART NO					



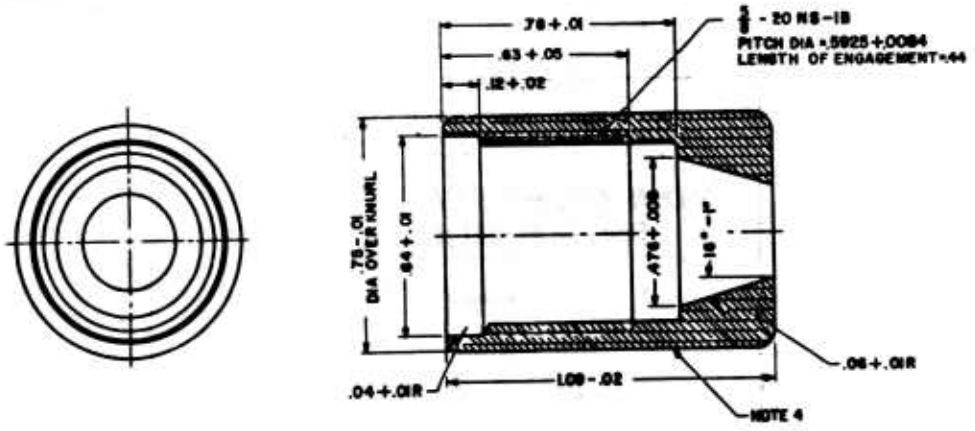


MARKING DIAGRAM

Figure 31

REVISIONS			
SYB	DESCRIPTION	DATE	APPROV'A
A	EO-PA 2507		
B	EO-PA 4009		

69



NOTES:-
1- SPEC MIL-G-2550, MIL-STD-9 AND MIL-STD-10 APPLY.
2- MATERIAL:- PLASTIC, NYLON, SPEC MIL-P-17091.
3- THE COLOR SHALL BE SIMILAR TO COLOR, GREEN NO. 34086 OR NO. 34087, FED-STD NO. 595, OR INTERMEDIATE SHADES WHICH SHALL BE GOVERNED BY MUNSELL COLORS, HUE 5.0Y TO 7.5Y VALUES 2-4, CHROMAS 2-4.
4- STRAIGHT KNURL .032 PITCH, .015 DEEP FULL LENGTH. MIL-STD-10 DOES NOT APPLY.

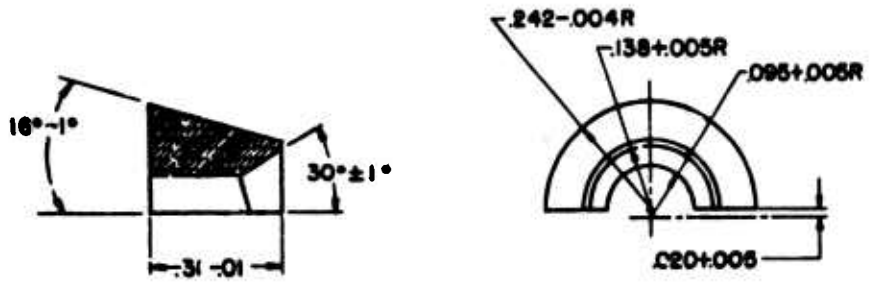
Figure 32

ORDNANCE PART NO. 8822498

F8822497	POINTER, TIME BLASTING FUSE, M60	CAP, FUSE HOLDER	PICATINNY ARSENAL ORDNANCE CORPS DEPT OF THE ARMY DOVER, NEW JERSEY
SEE ENGINEERING RECORDS			C 8822498
APPLICATION		SCALE 1	SHEET OF

00 POSTS APR 54 1176

REVISIONS			
STR	DESCRIPTION	DATE	APPROVAL
A	EO-PA 2507	5-29-59	
B	EO-PA 4009	4-29-60	



NOTES:-
1 - SPEC MIL-G-2550 APPLIES.
2 - MATERIAL:- PLASTIC, NYLON, SPEC MIL-P-17091.
3 - THE COLOR SHALL BE SIMILAR TO COLOR, GREEN NO. 34086 OR NO. 34087, FED. STD 595, OR INTERMEDIATE SHADES WHICH SHALL BE GOVERNED BY MUNSELL COLORS, HUE 5.0Y TO 7.5Y, VALUES 2-4, CHROMAS 2-4.

Figure 33

(A) (B)

ORDNANCE PART NO. 8822499

FS822497	IGNITER, TIME BLASTING FUSE WP, M60	PHYSICAL PROPERTIES: TP, TS, EL2, RA, BH, BH	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES ON FRACTIONS DECIMALS ANGLES; MATERIAL SEE NOTE 2; HEAT TREATMENT; FINAL PROTECTIVE FINISH	ORIGINAL DATE OF DRAWING APRIL 17, 1959; SUBMITTED; APPROVED BY ORDER OF THE CHIEF OF ORDNANCE	COLLET
SEE ENGINEERING RECORDS; APPLICATION; DO NOT APPLY PART NO					SCALE 4/1 UNIT WT A-15

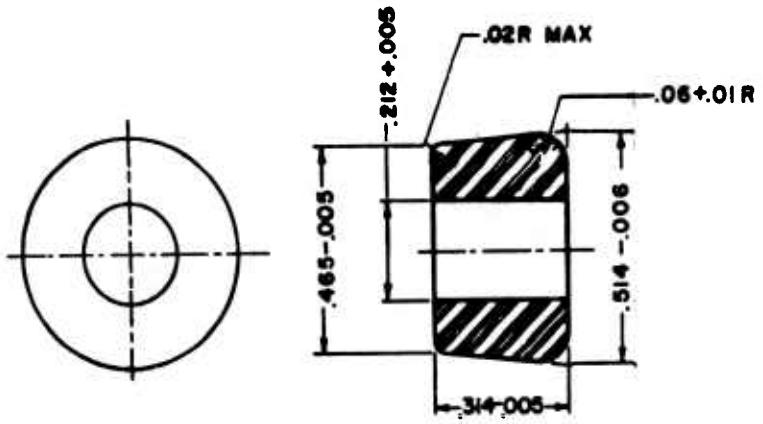
PICATINNY ARSENAL
ORDNANCE CORPS
DEPT OF THE ARMY
DOVER, NEW JERSEY

DWG SIZE B — 8822499 — SHEET OF

00 FORM 1 APR 54 1176

B8822500

REVISIONS			
STD	DESCRIPTION	DATE	APPROVAL
A	EO-PA 2507	5-29-59	
B	EO-PA 4009	4-29-60	



NOTES:-
1 - SPEC MIL-G-2550 APPLIES.
2 - MATERIAL:- RUBBER, TYPE R, CLASS RS, GRADE NO. RS 609, A, B, FF, SPEC MIL-R-3065.

Figure 34

A B

ORDNANCE PART NO. 8822500

F8822497	IGNITER, TIME BLASTING FUSE, WR M60	PHYSICAL PROPERTIES: YP, TS, EL2, BH, BN	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES ON FRACTIONS DECIMALS ANGLES; MATERIAL SEE NOTE 2; HEAT TREATMENT; FINAL PROTECTIVE FINISH	ORIGINAL DATE OF DRAWING APRIL 17, 1959; DRAFTSMAN WDS; CHECKED; TRACED; CHECKED; SUBMITTED; APPROVED BY ORDER OF THE CHIEF OF ORDNANCE B. Lacy	GROMMET	PICATINNY ARSENAL ORDNANCE CORPS DEPT OF THE ARMY DOVER, NEW JERSEY
SEE ENGINEERING RECORDS						
APPLICATION						
DO NOT APPLY PART NO					SCALE 4/1 UNIT WT A-16	DWG SIZE B 8822500 SHEET OF

00 FORM 1 APR 54 1181

A8822502

NOTICE. -- When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

PHYSICAL PROPERTIES	
YP	
TS	
EL2	
RA	
BH	
BH	

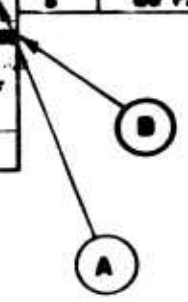
DO NOT APPLY PART NO.
DO AS SPECIFIED

APPLICATION

NEXT ASSY	USED ON
[redacted]	IGNITER, TIME, ELASTIC FUSE, WEATHERPROOF M60

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	ED PA-2507	5-29-59	
B	ED PA-4089	6-29-60	



[redacted]

.35 + .01 ID = .95 - .01 OD = .050 - .005 THICK

NOTES:-
1-SPEC MIL-S-2590 APPLIES.
2-MATERIAL:-PLASTIC, NYLON, SPEC MIL-P-17091.
3-THE COLOR SHALL BE SIMILAR TO COLOR, GREEN NO. 34086 OR NO. 34087, FED-STD-595. OR INTERMEDIATE SHADES WHICH SHALL BE GOVERNED BY MUNSELL COLORS, HUE 5.0Y TO 7.5Y, VALUES 2-4, CHROMAS 2-4.

Figure 35

ORDNANCE PART NO. 8822502

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

MATERIAL SEE NOTE 2

HEAT TREATMENT

FINAL PROTECTIVE FINISH

ORIGINAL DATE OF DRAWING APR 17, 1959

DRAFTSMAN [illegible] CHECKED

TRACED N.P. CHECKED

ENG ENG

SUBMITTED [illegible] ORD

APPROVED BY ORDER OF THE CHIEF OF ORDNANCE
[illegible] OC ORD

WASHER, LARGE

PICATINNY ARSENAL
ORDNANCE CORPS
DEPT OF THE ARMY
DOVER, NEW JERSEY

SCALE

UNIT WT A-17

SIZE A

8822502

SHT OF

00 FORM 1 APR 54 1181

A8822503

NOTICE.—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

PHYSICAL PROPERTIES	
YP	
TS	
ELE	
RA	
BH	
BH	

DO NOT APPLY PART NO.
DO AS SPECIFIED

APPLICATION

NEXT ASSY	USED ON
F8822497	IGNITER, TIME BLASTING FUSE WEATHERPROOF M60

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	ED PA-2507	5-29-59	
B	ED PA-4009	4-29-60	

WASHER

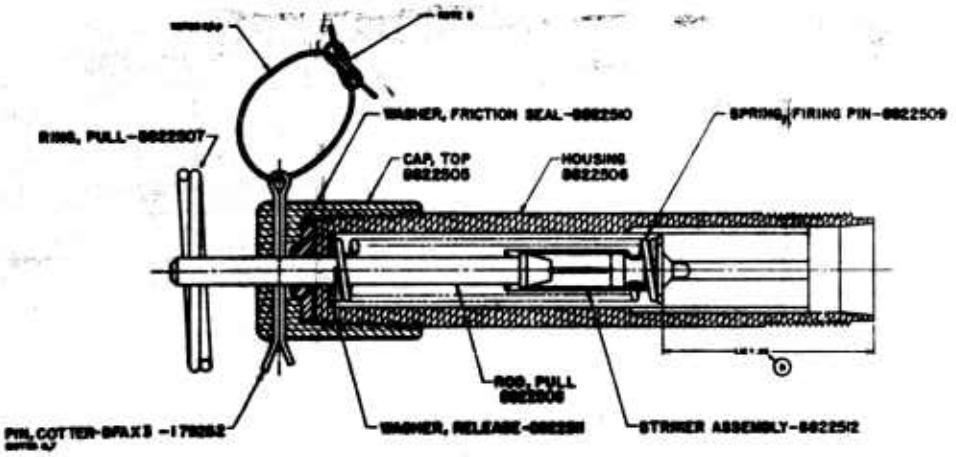
.218 + .005 ID x .450 - .005 OD x .050 - .005 THICK

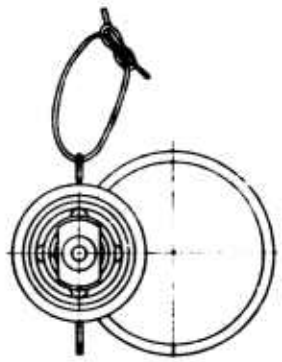
NOTES:-
1-SPEC MIL-G-2550 APPLIES.
2-MATERIAL:-PLASTIC, NYLON, SPEC MIL-P-17091.
3-THE COLOR SHALL BE SIMILAR TO COLOR, GREEN NO. 34086 OR NO. 34087, FED-STD-595, OR INTERMEDIATE SHADES WHICH SHALL BE GOVERNED BY MUNSELL COLORS, HUE 5.0Y TO 7.5Y, VALUES 2-4, CHROMAS 2-4.

Figure 36

ORDNANCE PART NO. 8822503

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES	ORIGINAL DATE OF DRAWING APR 17,1959	WASHER, SHIM	PICATINNY ARSENAL ORDNANCE CORPS DEPT OF THE ARMY DOVER, NEW JERSEY
MATERIAL SEE NOTE 2	DRAFTSMAN	CHECKED	
HEAT TREATMENT	TRACED	CHECKED	
FINAL PROTECTIVE FINISH	ENGR	ENGR	
	SUBMITTED ORD CORPS	SCALE	SIZE A — 8822503
	APPROVED BY ORDER OF THE CHIEF OF ORDNANCE ORD CORPS	UNIT WT A-18	SHEET OF





NOTES:-
1- [illegible]
2- [illegible]
3- [illegible]
4- [illegible]
5- [illegible]
6- [illegible]
7- [illegible]

Figure 37

FIRING ASSEMBLY

F 8822504

A-19

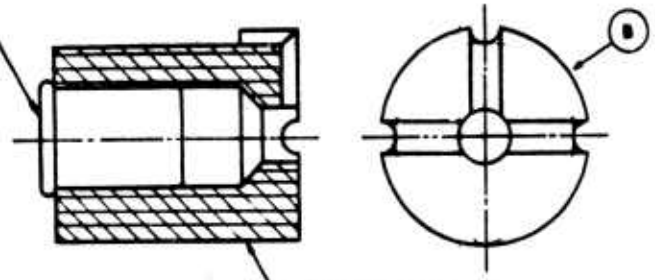
00 FORM 1 APR 54 1176

NOTICE—The Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

SYMBOL	DESCRIPTION	DATE	APPROVED
A	EO-PA 2507	3-29-60	
B	EO-PA 4009	4-29-60	

99

PRIMER, PERCUSSION M39A1-8798919



BASE, PRIMER
8822516

NOTES:-
1- SPEC MIL-G-2550 APPLIES.
2- SPEC PA-PD-1735 APPLIES EXCEPT THE FUNCTIONING LIMIT H +5S SHALL NOT EXCEED 13 INCHES.

Figure 38

B A

ORDNANCE PART NO. 8822515

F8822497	IGNITER, TIME BLASTING FUSE, WP, M60	
SEE ENGINEERING RECORDS		
NEXT ASSY	USED ON	
APPLICATION		
DO NOT	APPLY PART NO.	

PHYSICAL PROPERTIES: YP, TS, EL2, RA, BH, BB

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCE ON FRACTIONS DECIMALS ANGLES; MATERIAL; HEAT TREATMENT; FINAL PROTECTIVE FINISH

ORIGINAL DATE OF DRAWING APRIL 17, 1959
DRAFTSMAN WDS CHECKED
TRACED CHECKED
ISSUED ENGR
SUBMITTED
APPROVED BY ORDER OF THE CHIEF OF ORDNANCE
B. Lewis

PRIMER BASE ASSEMBLY

PICATINNY ARSENAL
ORDNANCE CORPS
DEPT OF THE ARMY
DOVER, NEW JERSEY

SCALE 4 UNIT WT A-20

DWG SIZE B | 8822515

SHEET OF

P8697-3Ct

ORD FORM 1176 1 APR 54

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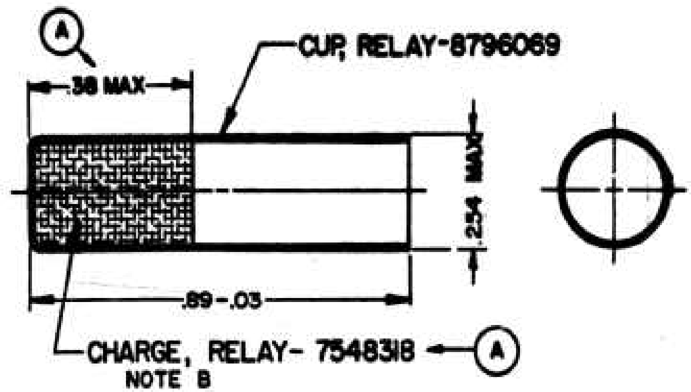
(A) — 8796061

REVISIONS			
	DESCRIPTION	DATE	APPROVAL
A_1	REF TO C8796084 ADDED, DIM AND NOTE CHANGED & REVISED TO CONFORM TO ORDM 4-41; [illegible]	8-8-57	[illegible]
B	EO-OAC 1681	3-20-59	W.E. [illegible]



NOTES:—

A-SPEC MIL-G-2550 APPLIES.

(A) — B-LOAD WITH 350 MILLIGRAMS (5.4 GRAINS) MINIMUM, ADVISORY 390 MILLIGRAMS (6 GRAINS) MEAN WEIGHT, PETN, CLASS A, SPEC JAN-P-387, MOISTURE CONTENT = .2 % MAX, PRESS AT 8,000 PSI.

Figure 39

NOTICE: THIS DRAWING [illegible] NOT BE USED [illegible] REPRODUCED EITHER WHOLLY OR IN PART EXCEPT WHEN AUTHORIZED IN CONNECTION WITH UNITED STATES GOVERNMENT PROCUREMENT.

PART NO. 8796061

SEE ENGINEERING RECORDS		PHYSICAL PROPERTIES		UNLESS OTHERWISE SPECIFIED
8B032282	WARHEAD [illegible]	YP		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES
C8796054	[illegible]	TS		
C8796084	BORO ASSY M24	EL2		MATERIAL
C8796088	WARHEAD [illegible]	RA		
C8796084	WARHEAD [illegible]	BH		HEAT TREATMENT
NEXT ASSY	USED ON			
APPLICATION		RH		FINAL PROTECTIVE FINISH
DO NOT	APPLY PART NO.			

ORIGINAL DATE OF DRAWING APR 28 1956
DRAFTSMAN E.R.
TRACER J.H.
CHECKER [illegible]
ENGR [illegible]
SUBMITTED [illegible] ORD CORPS
APPROVED BY ORDER OF THE CHIEF OF ORDNANCE
W R Carson, ORD CORPS

RELAY ASSEMBLY

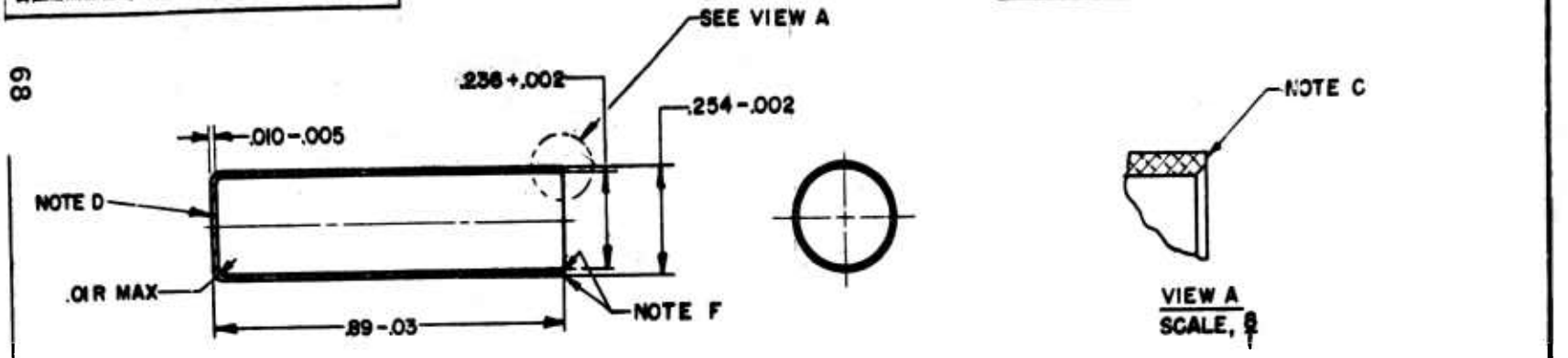
SCALE 4/1 | UNIT WT. | A-21

ORDNANCE CORPS
DEPT OF THE ARMY
PICATINNY ARSENAL
DOVER, NEW JERSEY

DWG SIZE B | 8796061
SHEET 1 OF 1

P-85931B

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
A_3	REF TO 8796061 ADDL & REV TO CONFORM TO ORDM 4-4; ED-OAC 1189	8-8-57	
B	EO-CAL 1921	3-20-59	W.S.



NOTES:-

A- SPEC MIL-G-2550 APPLIES.

B- MATERIAL:- ALUMINUM-ALLOY, SHEET, TEMPER O, SPEC QQ-A-318 OR QQ-A-359.

C- THE THICKNESS OF THE TRIMMED EDGE OF THE CUP SHOULD NOT EXCEED ONE-HALF THE NOMINAL WALL THICKNESS. ALL REDUCTION IN WALL THICKNESS SHOULD BE REFLECTED AS AN INCREASE IN INSIDE DIAMETER.

D- .01 CONCAVITY OR CONVEXITY PERMITTED.

E- TO BE CAPABLE OF BEING FLATTENED ALONG ITS AXIS WITHOUT FRACTURING.

F- NO SHARP EDGES PERMITTED.

Figure 40

PART NO. 8796069

SEE ENGINEERING RECORDS	
8879606I	WARHEAD XM45
8879606I	NO. HARNESS ASSY GM-M45
8879606I	CORD ASSY MC-6
8879606I	WARHEAD MK-8A
NEXT ASSY	USED ON
APPLICATION	
DO NOT	APPLY PART NO.

PHYSICAL PROPERTIES	
YP	
TS	
EL2	
RA	
BH	
RH	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS DECIMALS ANGLES

MATERIAL
SEE NOTE B

HEAT TREATMENT

FINAL PROTECTIVE FINISH

ORIGINAL DATE OF DRAWING APRIL 28, 1956
DRAFTSMAN DR CHECKER
TRACER L H CHECKER
ENGR ENGR
SUBMITTED
ORD CORPS
APPROVED BY ORDER OF THE CHIEF OF ORDNANCE
ORD CORPS

CUP, RELAY

SCALE 4/1 UNIT WT A-22

ORDNANCE CORPS
DEPT OF THE ARMY
PICATINNY ARSENAL
DOVER, NEW JERSEY

DWG NO 8796069
SIZE B
SHEET 1 OF 1

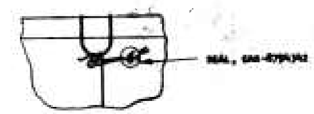
C8861840

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

LIST OF PARTS

LINE NO.	NAME OF PART	NO. REQD.	MATERIAL KIND	MATERIAL GRADE	DRAWING OR SPEC NUMBER *	REMARKS
1	BOX, PACKING	1	WOOD	A, TYPE I, CL I	MIL-B-46506	
2						
3	FILLER, END	A	COMPOSITION BOARD	TYPE I OR II	MIL-B-3106	
4	FILLER, SIDE	A	COMPOSITION BOARD	TYPE I OR II	MIL-B-3106	
5	FILLER, TOP & BOTTOM	A	COMPOSITION BOARD	TYPE I OR II	MIL-B-3106	
6						
7	SEAL, CAR	1			F8794342	
8						
9						
10						
11						
12						
13						
14						
15						

* THE SPECIFICATION NUMBERS SHOWN ARE BASIC NUMBERS ONLY. WHEN A SPECIFICATION IS REVISED A LETTER IS AFFIXED TO ITS BASIC NUMBER.
A-AS REQUIRED.



VIEW OF CAR SEAL

BOX, PACKING

15 5/16 x 13 5/16 x 9 1/8 INSIDE DIMENSIONS
TOLERANCE OF INSIDE DIMENSIONS + 1/8
OVERALL O.D. 17 11/16 x 14 3/8 x 10 25/32

FILLER, END

13 1/8 MIN x 8 7/8 MIN x 1/16 THICK

FILLER, SIDE

15 1/8 MIN x 13 1/8 MIN x 1/16 THICK

FILLER, TOP & BOTTOM

15 1/8 MIN x 13 1/8 MIN x 1/16 THICK

MARKING INSTRUCTIONS

THE BOX SHALL BE MARKED IN ACCORDANCE WITH DRAWING C8796522.
THE ICC NOMENCLATURE TO BE APPLIED SHALL BE:-
"HIGH EXPLOSIVES-DANGEROUS".
THE DESCRIPTIVE NOMENCLATURE OF THE ITEM PACKED SHALL BE:-
"1-DEMOLITION KIT BLASTING XM-".
THE CUBICAL DISPLACEMENT SHALL BE:-
THE FSN AND DODIC SHALL BE:-

STORAGE AND SHIPPING INFORMATION (DO NOT MARK ON PACKAGE)

THE EXPLOSIVE HAZARD (QUANTITY-DISTANCE) SHALL BE:-
THE STORAGE COMPATABILITY SHALL BE:-
THE ICC FOR BILL OF LADING PURPOSES SHALL BE:-

PACKING INSTRUCTIONS

FORM BOX IN ACCORDANCE WITH SPECIFICATION MIL-B-46506, FIGURE 8.
PACK ONE CARTON.
INSERT ONE FILLER AT EACH END, EACH SIDE, AND TOP AND BOTTOM. ADD ANY ADDITIONAL FILLERS IF REQUIRED FOR TIGHT PACKING.
CLOSE AND SEAL THE BOX IN ACCORDANCE WITH SPECIFICATION MIL-B-46506, FIGURE 9.
APPLY CAR SEAL UNDER CENTER WIRE AND THROUGH LOOP AS SHOWN.

FOR CARTON, SEE DRAWING C8861841.

LINE NO.	LIST OF DRAWINGS	DRAWING NUMBER
1	BOX, PACKING	C8861840
2		
3	MARKING DIAGRAM & SEALING, ETC	C8796522
4		
5	SEAL, CAR	F8794342
6		

LINE NO.	WEIGHTS (ESTIMATED) PART	POUNDS
1	BOX, PACKING (EMPTY)	7.0
2	KIT	10.0
3	CARTONS, ETC	11.0
4		
5	TOTAL	28.0

Figure 41

ORDNANCE PART NO. 8861840

SEE ENGINEERING RECORDS
NEXT ASSY — USED ON
APPLICATION
DO NOT DC — APPLY PART NO AS SPECIFIED

PHYSICAL PROPERTIES: YP, TS, ELL, RA, BH, BH

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES
MATERIAL
HEAT TREATMENT
FINAL PROTECTIVE FINISH

ORIGINAL DATE OF DRAWING FEB 16, 1968
SUBMITTED
APPROVED

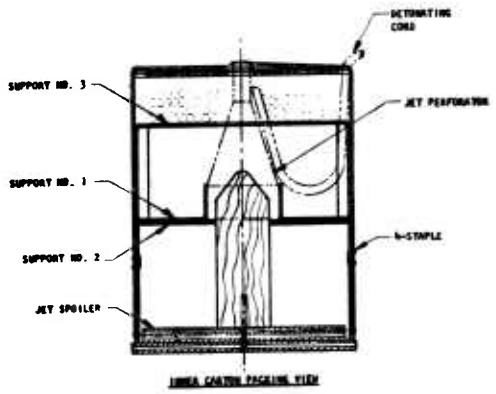
BOX, WIREBOUND, PACKING, AMMUNITION, FOR DEMOLITION KIT, BLASTING, XM-

SCALE — UNIT WT — A-23

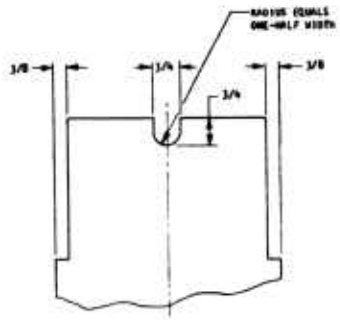
PICATINNY ARSENAL
ORDNANCE CORPS
DEPT OF THE ARMY
DOVER, NEW JERSEY

C 8861840
SHEET OF

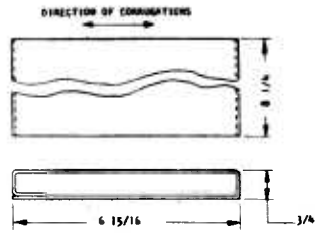
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



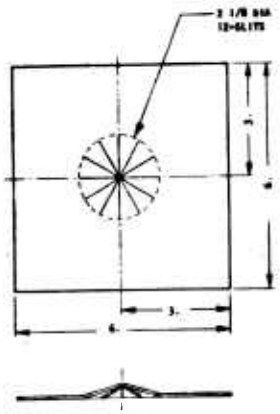
INNER CARTON PACKING VIEW



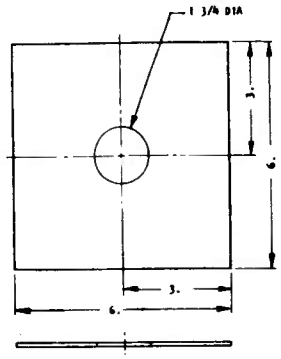
VIEW OF TOP FLAPS OF INNER CARTON



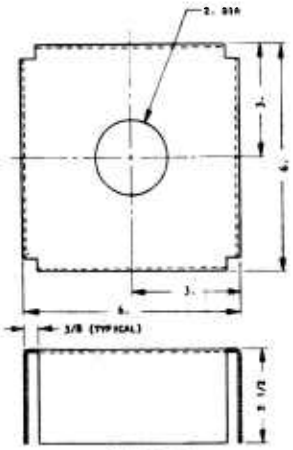
SPACER NO. 2



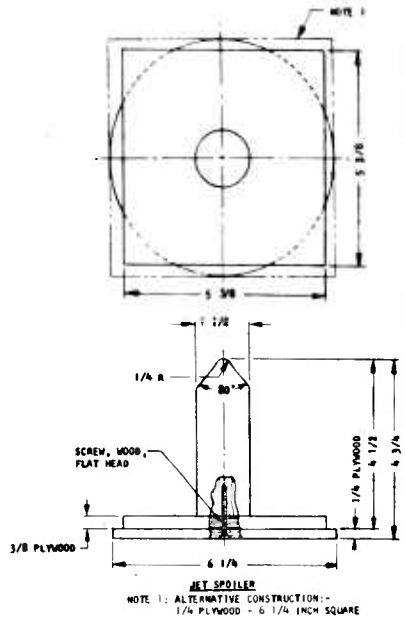
SUPPORT NO. 1



SUPPORT NO. 2



SUPPORT NO. 3



JET SPOILER

NOTE 1: ALTERNATIVE CONSTRUCTION:- 1/4 PLYWOOD - 6 1/4 INCH SQUARE

ORDNANCE PART NO. 8861841

		PHYSICAL PROPERTIES	UNLESS OTHERWISE SPECIFIED	ORIGINAL DATE OF DRAWING FEB 16,1962	CARTON, PACKING, AMMUNITION, FOR DEMOLITION KIT, BLASTING, XM-.	PICATINNY ARSENAL ORDNANCE CORPS DEPT OF THE ARMY DOVER, NEW JERSEY	
		YP	DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES	DRAFTSMAN JB CHECKED			
		TS		TRACER CHECKED			
		EL2	MATERIAL	TECH ENGR			
SEE ENGINEERING RECORDS		RA		SUBMITTED GR Bird for ORD ENGR ORD CORPS			
NEXT ASSY	USED ON	BH	HEAT TREATMENT				
APPLICATION		RH		APPROVED BY ORDER OF THE CHIEF OF ORDNANCE ORD CORPS			
DO NOT DO	APPLY PART NO. AS SPECIFIED		FINAL PROTECTIVE FINISH		SCALE 1/2	UNIT WT	SIZE C 8861841 SHEET 2 OF 2

Figure 42

C8861841

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

LIST OF PARTS

LINE NO.	NAME OF PART	NO. REQD.	MATERIAL: KIND	MATERIAL: GRADE	DRAWING OR SPEC NUMBER *	REMARKS
1	AMMO & SPL WPN GEN SPEC FOR				MIL-A-2550	
2						
3	BAG	1	BARRIER MATERIAL	TYPE I, CL a	MIL-B-117	
4	CARTON, INNER	4	CORRUGATED FIBERBOARD	STYLE RSC, TYPE I, CL 1	PPP-B-636	B,C,L
5	CARTON, OUTER	1	CORRUGATED FIBERBOARD	STYLE RSC, TYPE I, CL 1	PPP-B-636	B
6	CUSHION	2	CUSHIONING MATERIAL, DIMPLE EMBOSSED	TYPE II, CL B	PPP-C-843	
7						
8	FILLER	1	FIBERBOARD	TYPE II, CL 1	PPP-B-636	B
9	FOLDER	1	FIBERBOARD	STYLE OPF TYPE I, CL 1	PPP-B-636	B
10	JET SPOILER	4	WOOD			E,F
11	LABEL	1	GUMMED PAPER (WHITE)		COMMERCIAL	G,H
12	SCREW, WOOD, FLAT HEAD	4	STEEL, NO. 10 x 1 1/2 LONG		FF-S-111	
13	SPACER, NO. 1	1	PLYWOOD, INTERIOR TYPE	A-D	NN-P-530	
14	SPACER, NO. 2	1	CORRUGATED FIBERBOARD	TYPE I, CL 1	PPP-B-636	B
15	STAPLE	12	STEEL		COMMERCIAL	
16	STRIP, SEALING, INNER	6	TAPE, BLACK		MIL-T-43036	
17	STRIP, SEALING, OUTER	2	TAPE, BLACK		MIL-T-43036	
18	SUPPORT, NO. 1	4	FIBERBOARD	TYPE II, CL 1	PPP-B-636	F
19	SUPPORT, NO. 2	4	FIBERBOARD	TYPE II, CL 1	PPP-B-636	D
20	SUPPORT, NO. 3	4	FIBERBOARD	TYPE I, CL 1	PPP-B-636	B
21		A	FILLER MATERIAL, CHIPBOARD		COMMERCIAL	
22		A	INK, STENCIL, BLACK NO. 37038		TT-I-559	K
23						

* THE SPECIFICATION NUMBERS SHOWN ARE BASIC NUMBERS ONLY. WHEN A SPECIFICATION IS REVISED A LETTER IS AFFIXED TO ITS BASIC NUMBER.
A-AS REQUIRED.
B-200. LB MINIMUM TEST BOARD, B FLUTE.
C-SPECIFICATION APPLIES EXCEPT ALL FLAPS OF INNER CARTON SHALL BE 3 3/8 INCHES AND TOP FLAPS DIECUT AS SHOWN.
D-500. LB MINIMUM TEST BOARD.
E-WOOD, GROUP IV, SPECIFICATION MIL-B-2427; PLYWOOD, INTERIOR TYPE, GRADE A-D, SPECIFICATION NN-P-530.
F-MAY BE LAMINATED OR MADE OF ONE PIECE.
G-WEIGHT (UNGUMMED) 32. LB PER 1000 SHEETS, 17. x 22. INCHES.
H-LABEL MAY BE OMITTED AND REQUIRED INFORMATION PRINTED OR STAMPED ON THE OUTER CARTON.
K-ALTERNATIVE MATERIAL:-FOR LABEL AND CARTON, COMMERCIAL BLACK PRINTER'S INK. FOR BAG, BLACK INDELIBLE INK, SPECIFICATION TT-I-542.
L-THE MANUFACTURER'S JOINT SHALL BE SECURED WITH A GUMMED CLOTH TAPE, METAL STAPLES OR STITCHES IN ACCORDANCE WITH PARAGRAPH 3.1.2.2 OF SPECIFICATION.

BAG

22 3/4 MIN x 26 3/4 MIN

CARTON, INNER

6. x 6. x 7. INSIDE DIMENSIONS
TOLERANCE ON INSIDE DIMENSIONS ± 1/32

CARTON, OUTER

14 1/2 x 12 3/4 x 8 3/8 INSIDE DIMENSIONS
TOLERANCE ON INSIDE DIMENSIONS ± 1/32

CUSHION

8. x 6. x 1/4 INCH THICK

FILLER

14. MIN x 12. MIN x 1/16 THICK

FOLDER

6 3/16 x 8 1/8 x 3/4 INSIDE DIMENSIONS

LABEL

4. x 2.

SPACER NO. 1

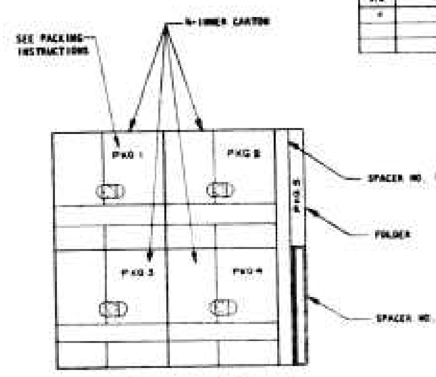
12 11/16 x 8 1/4 x 3/4 THICK

STRIP, SEALING, INNER

1. WIDE x 15. LONG
NOTE: ONE END SHALL BE FOLDED BACK ON ITSELF 1 1/2 INCHES TO FORM A PULL TAB

STRIP, SEALING, OUTER

1. WIDE x 20. LONG
NOTE: ONE END SHALL BE FOLDED BACK ON ITSELF 1 1/2 INCHES TO FORM A PULL TAB



OUTER CARTON PACKING ARRANGEMENT

MARKING INSTRUCTIONS

DEMOLITION KIT BLASTING XM-

LOT [ ][ ]-[ ]-[ ][ ] ← NOTE 1
LOADED [ ][ ]-[ ][ ] ← NOTE 2

SIZE OF LETTERS AND FIGURES FOR NOMENCLATURE 1/4 MIN: FOR LOT AND LOADED, 1/8 MIN.

NOTES:-
1-INSERT LOT NUMBER.
2-INSERT DATE (MONTH AND YEAR) LOADED.

PACKING INSTRUCTIONS

ALL MATERIAL SHALL BE THOROUGHLY DRY AT TIME OF PACKING.
MAXIMUM MOISTURE CONTENT OF ALL PACKING MATERIAL, 8%.
PRIOR TO PACKING (BEFORE THE DETONATING CORD IS THREADED THROUGH THE JET PERFORATOR), THE SUPPORT NO. 1 SHALL BE PLACED ON THE JET PERFORATOR, AS SHOWN.
PUSH BOTTOM INNER CARTON FLAPS UP INTO INNER CARTON TIGHTLY AND SECURE WITH ONE STAPLE IN EACH SIDE AS SHOWN.
PLACE SUPPORT NO. 2, JET PERFORATOR AND SUPPORT NO. 3 IN INNER CARTON, AND COIL APPLICABLE NUMBER OF FEET OF DETONATING CORD ON TOP OF SUPPORT NO. 3 AS SHOWN.
SECURE TOP FLAPS WITH ONE INNER SEALING STRIP.

PLACE IGNITER ASSEMBLY IN FOLDER WITH ONE CUSHION ON TOP AND BOTTOM.
SECURE FLAPS WITH TWO INNER SEALING STRIPS, PLACED 90° APART.

PACK FOUR INNER CARTONS, FOLDER, TWO SPACERS AND FOUR JET SPOILERS IN OUTER CARTON AS SHOWN. (THE FOUR INNER CARTONS AND THE FOLDER SHALL BE MARKED "PKG 1" THROUGH "5" IN 1/4 INCH HIGH LETTERS AND FIGURES AS APPLICABLE).
FOLD ONE INSTRUCTION SHEET AND PLACE IN CENTER OF PACK.
PLACE A FILLER ON TOP.
ADD ANY CHIPBOARD FILLER MATERIAL ALONG THE SIDES, ENDS AND ON TOP AS REQUIRED TO INSURE A TIGHT PACK.
SECURE THE FLAPS WITH TWO CENTER OUTER SEALING STRIPS.
PLACE LABEL ON OUTER CARTON.
BLUNT ALL CORNERS AND INSERT OUTER CARTON IN BAG.
EXHAUST EXCESS AIR WITHIN BAG AND SEAL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS WITH SEAL LOCATED AT EDGE OF BAG TO PROVIDE FOR A MINIMUM OF TWO SUBSEQUENT SEALS.
THE SEALS SHALL COMPLY WITH THE QUICK LEAK TEST OF SPECIFICATION MIL-P-116.

FOR PACKING BOX, SEE DRAWING C8861840.
FOR DEMOLITION KIT, BLASTING, XM- , SEE DRAWING

ORDNANCE PART NO. 8861841

SEE ENGINEERING RECORDS — NEXT ASSY / USED ON — APPLICATION — DO NOT DO APPLY PART NO AS SPECIFIED

PHYSICAL PROPERTIES: YP, TS, ELZ, RA, BH, RN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON FRACTIONS DECIMALS ANGLES
MATERIAL
HEAT TREATMENT
FINAL PROTECTIVE FINISH

ORIGINAL DATE OF DRAWING FEB 16, 1962
DRAFTSMAN JB
SUBMITTED ORD ENGR
APPROVED BY ORDER OF THE CHIEF OF ORDNANCE

CARTON, PACKING, AMMUNITION, FOR DEMOLITION KIT, BLASTING, XM-

PICATINNY ARSENAL
ORDNANCE CORPS
DEPT OF THE ARMY
DOVER, NEW JERSEY

C 8861841
SCALE 1/4 UNIT WT SHEET 1 OF 2

A-25

Figure 43

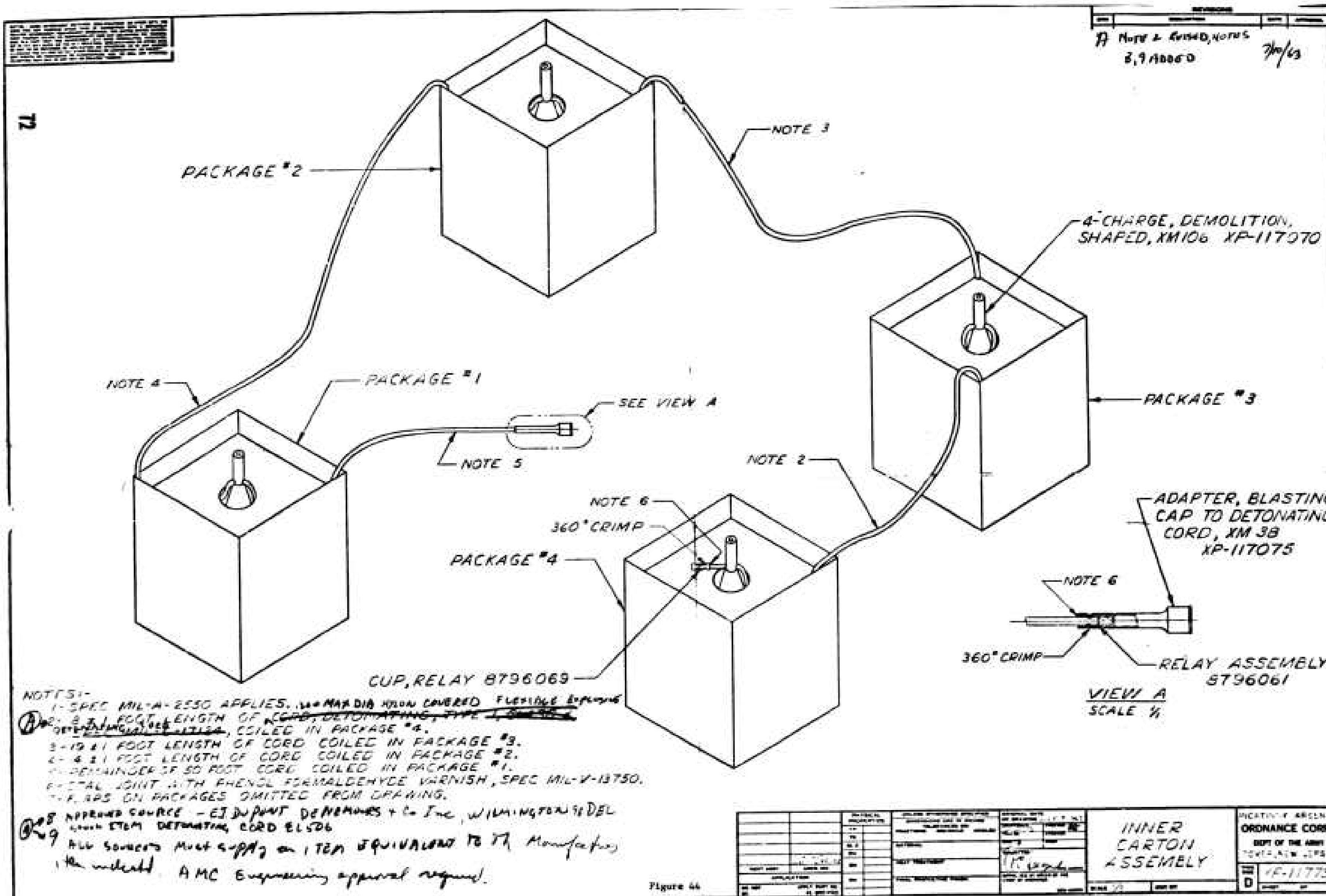
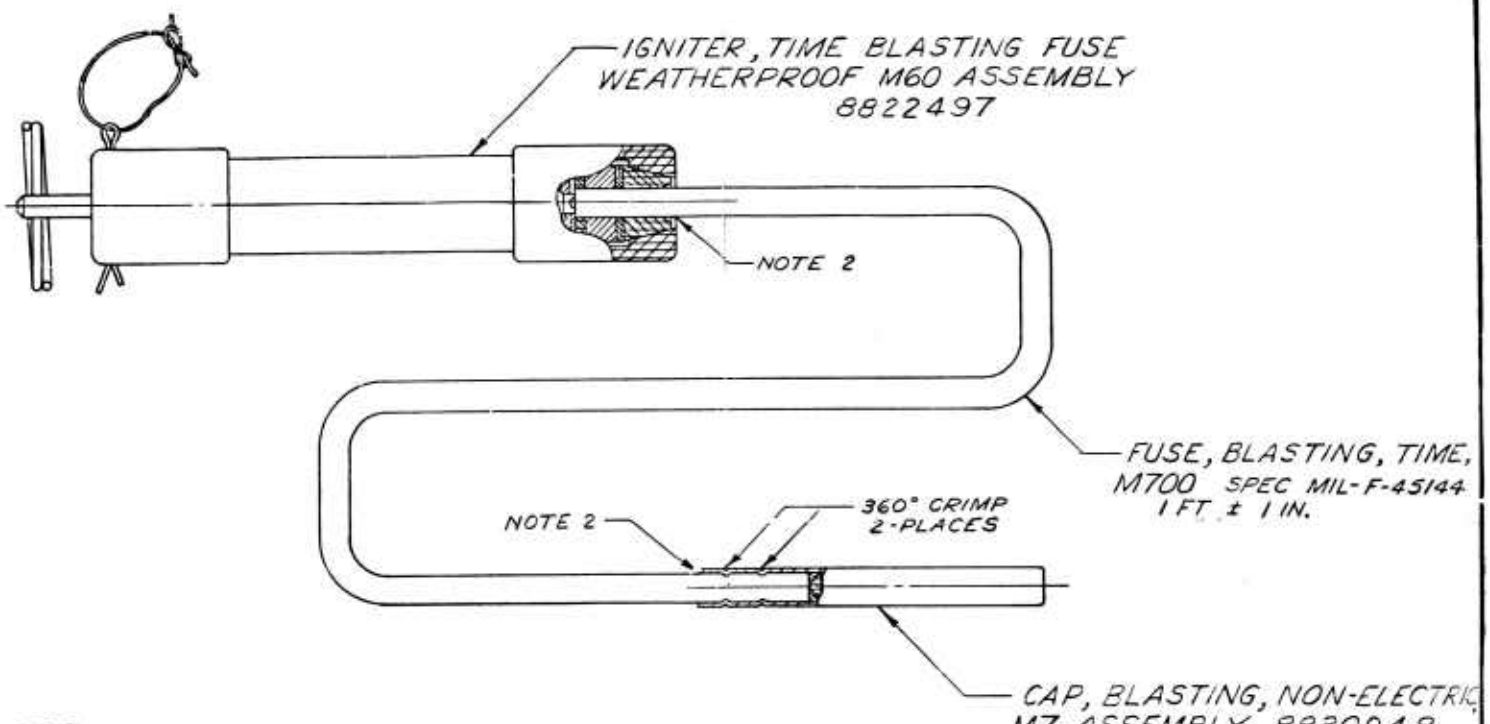

PACKAGE #2
NOTE 3
4-CHARGE, DEMOLITION, SHAPED, XM106 XP-117070
PACKAGE #3
NOTE 4
PACKAGE #1
SEE VIEW A
NOTE 5
NOTE 2
NOTE 6
360° CRIMP
PACKAGE #4
CUP, RELAY 8796069
ADAPTER, BLASTING CAP TO DETONATING CORD, XM 38 XP-117075
RELAY ASSEMBLY 8796061
VIEW A
SCALE 1/1
NOTES:-
1-SPEC MIL-A-2550 APPLIES.
2- FOOT LENGTH OF CORD, DETONATING, COILED IN PACKAGE #4.
3-19 ±1 FOOT LENGTH OF CORD COILED IN PACKAGE #3.
4-4 ±1 FOOT LENGTH OF CORD COILED IN PACKAGE #2.
5-REMAINDER OF 50 FOOT CORD COILED IN PACKAGE #1.
6-SEAL JOINT WITH PHENOL FORMALDEHYDE VARNISH, SPEC MIL-V-13750.
7-FLAPS ON PACKAGES OMITTED FROM DRAWING.
8 APPROVED SOURCE - EI DUPONT DE NEMOURS + Co Inc, WILMINGTON 98 DEL
9 ALL SOURCES MUST SUPPLY AN ITEM EQUIVALENT TO
AMC Engineering approval required.
INNER CARTON ASSEMBLY
ORDNANCE CORPS
DEPT OF THE ARMY
D

Figure 44



NOTES:-
1- SPEC MIL-A-2550 APPLIES.
2- SEAL JOINT WITH PHENOL FORMALDEHYDE VARNISH, SPEC MIL-V-13750.

IGNITER ASSEMBLY

PICATINNY ARSENAL
ORDNANCE CORPS
DEPT OF THE ARMY
DOVER, NEW JERSEY

SIZE C XP-117799

Figure 43

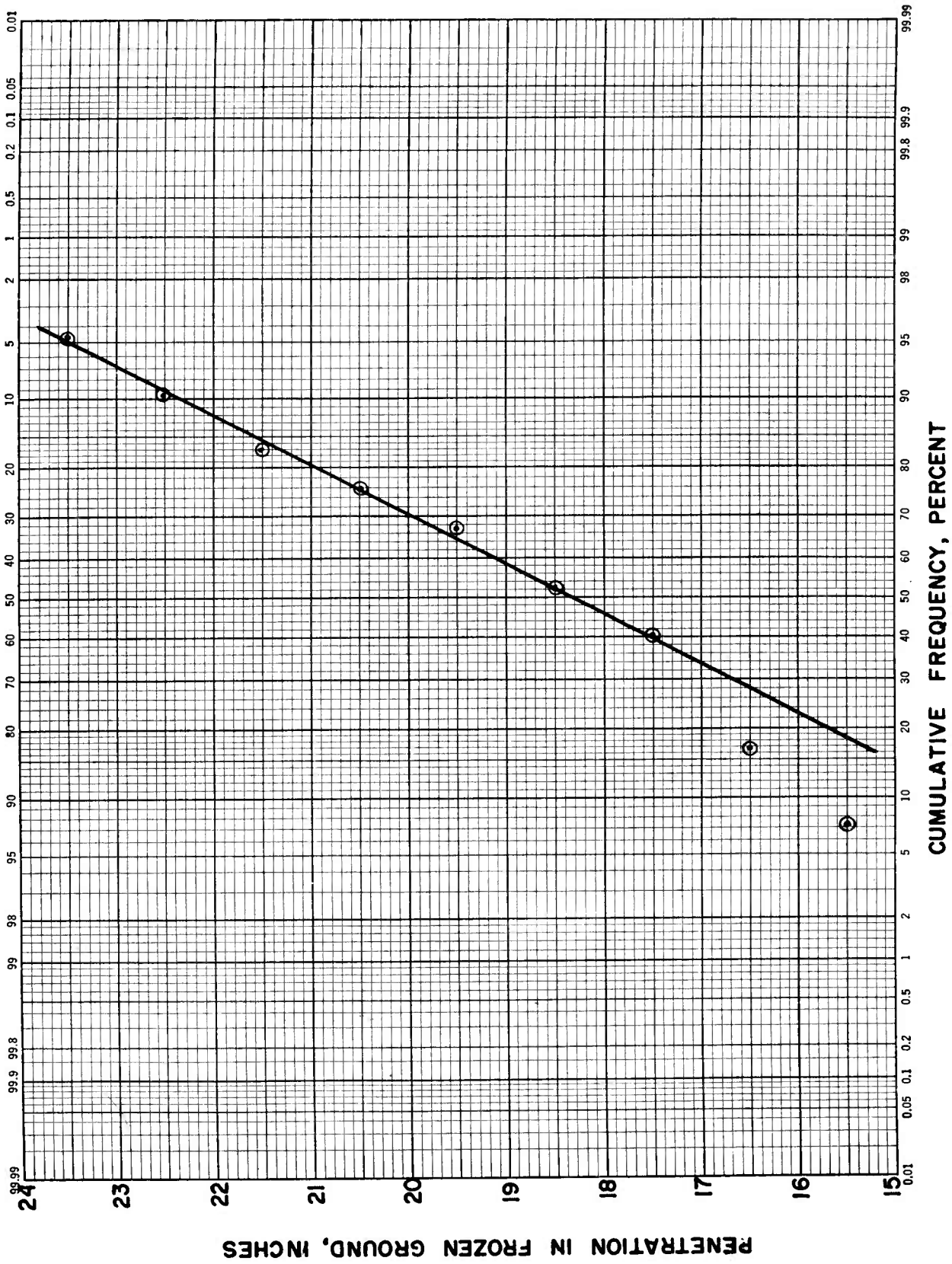


Figure 46
GRAPH 1 Penetrations in Frozen Ground

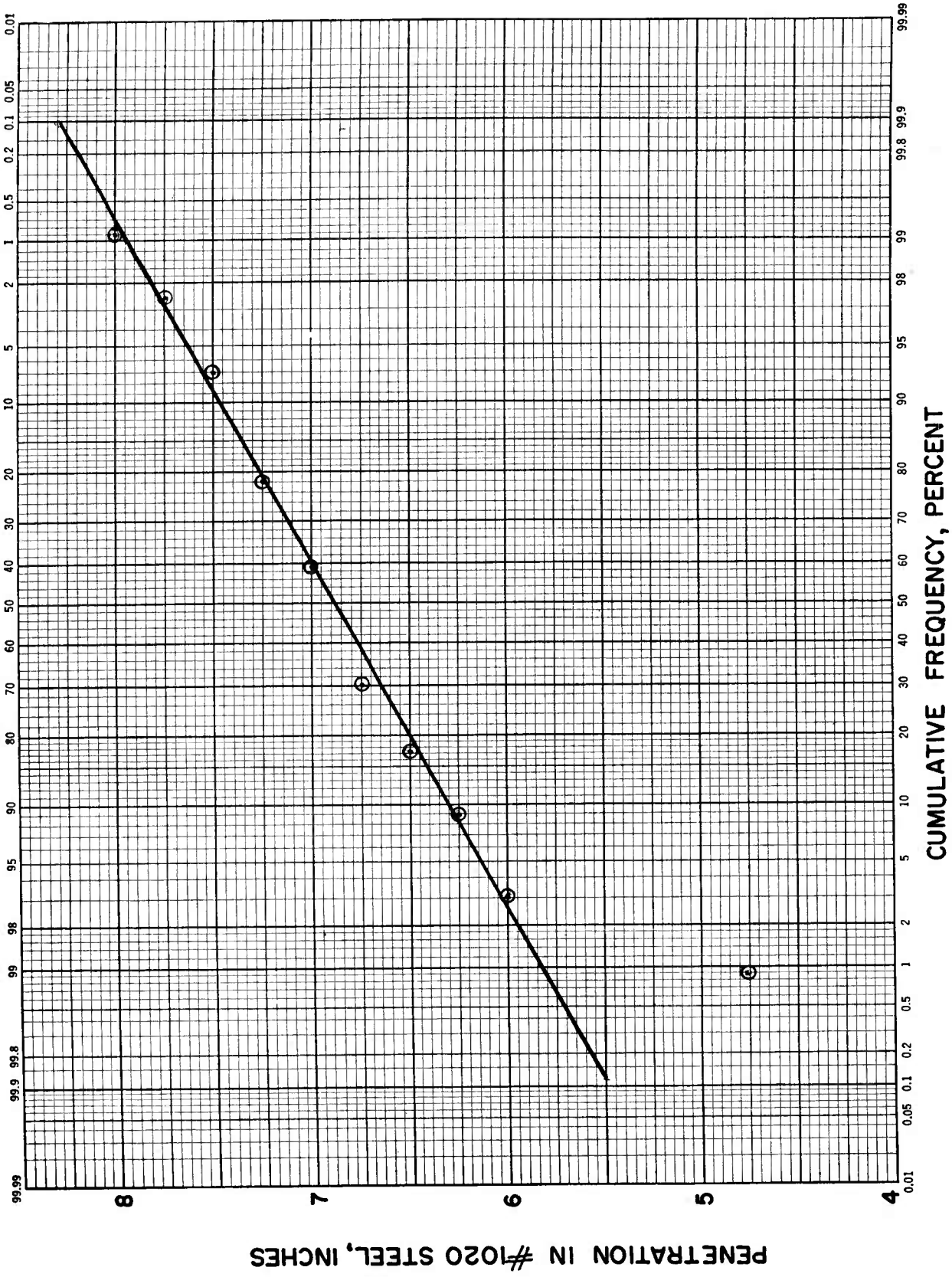
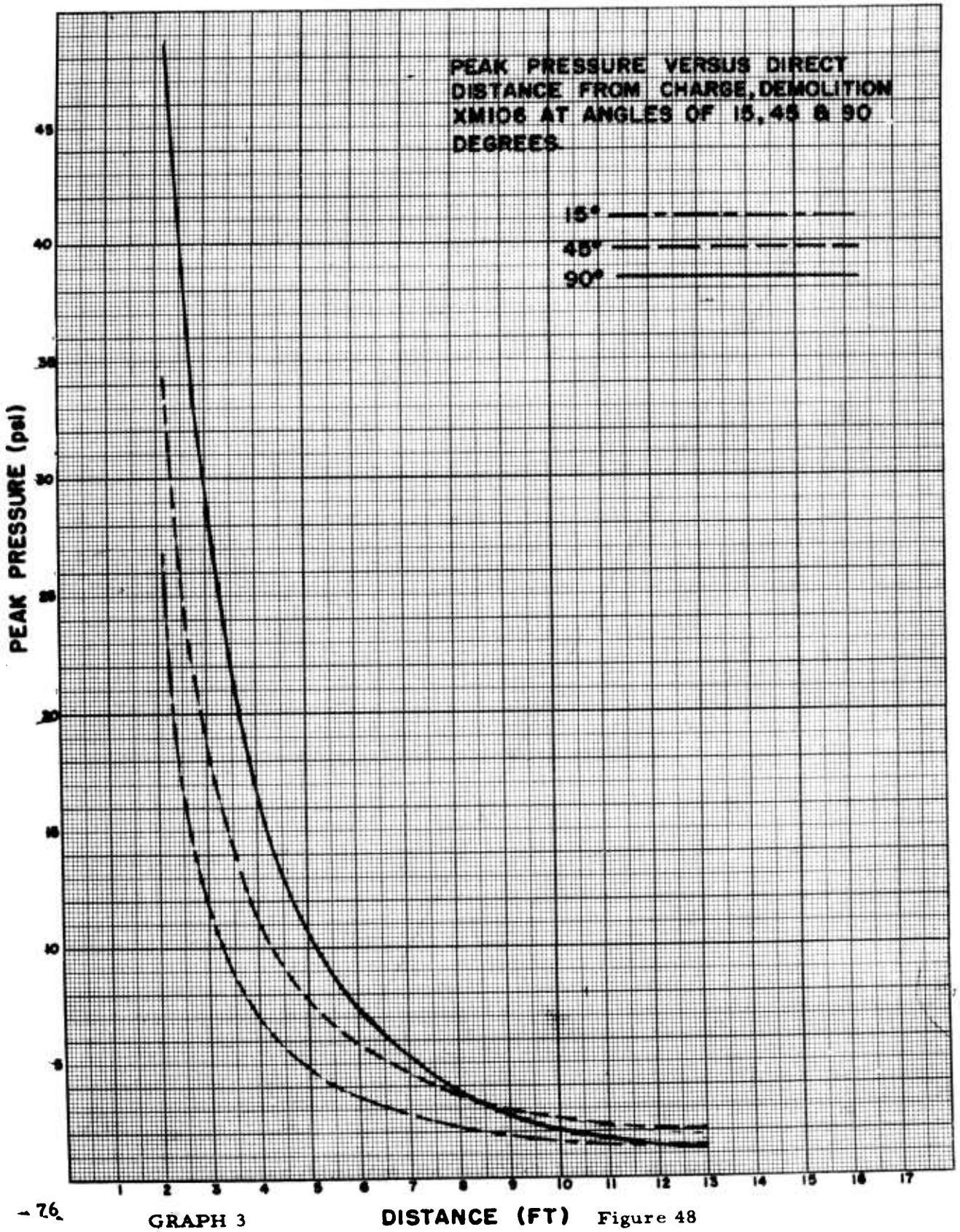
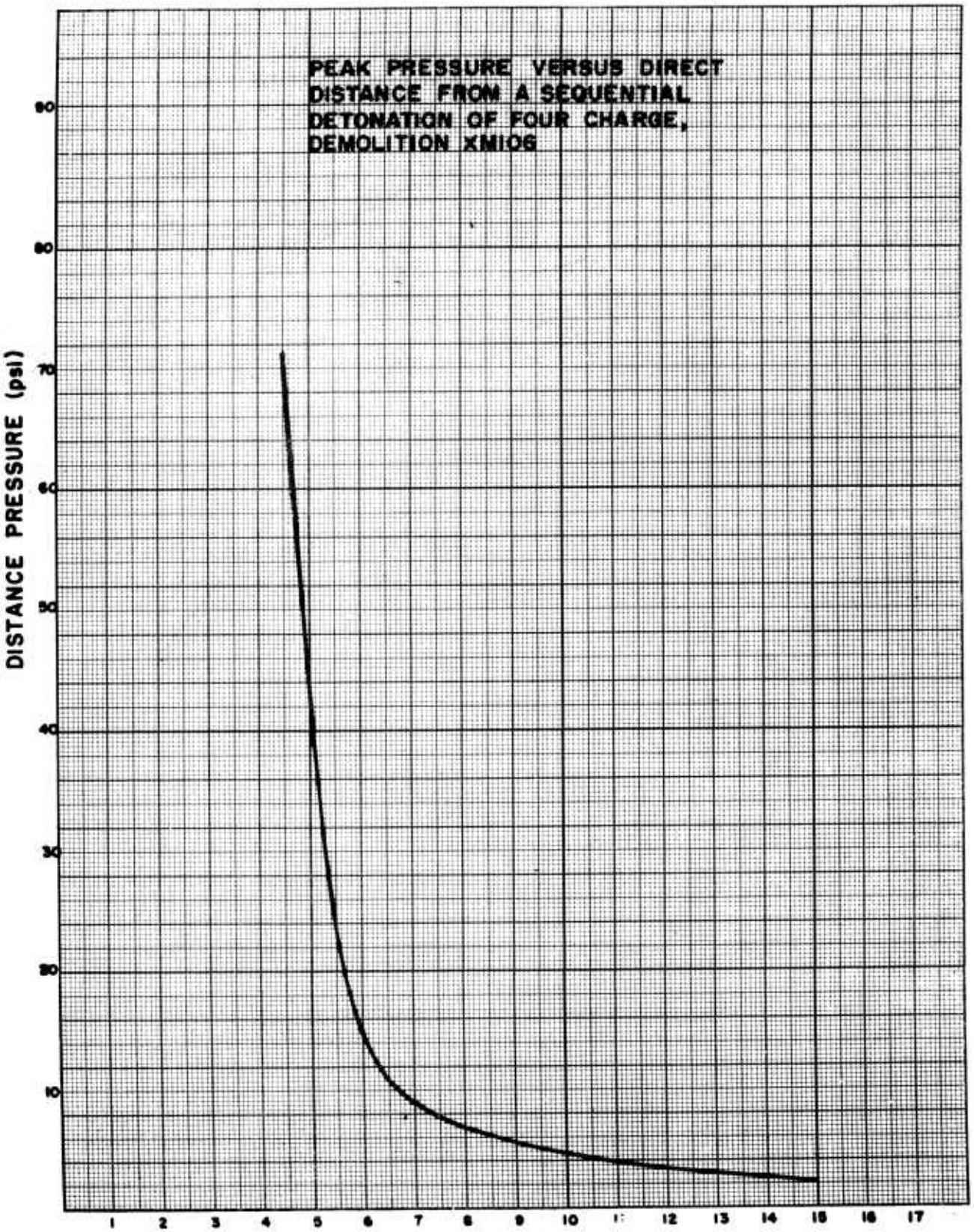


Figure 47
GRAPH 2 Penetrations in #1020 Steel

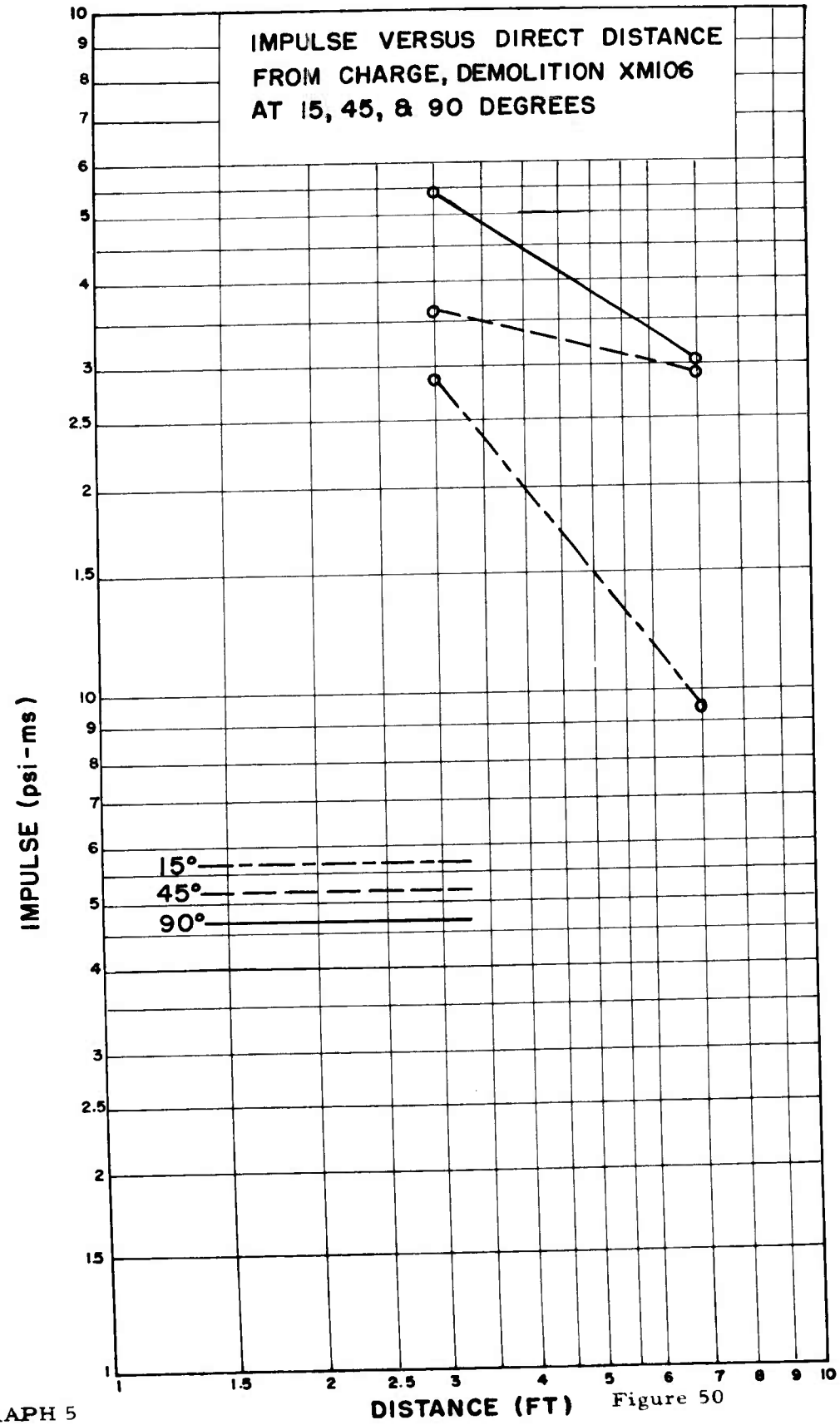


GRAPH 3

Figure 48



GRAPH 4 Figure 49



GRAPH 5

Figure 50

APPENDIX C

PARTS LIST

PARTS LIST

Name of Item	Item Dwg. No.	Item Spec No. and Date	Date of Dwg.
1. Charge, Demolition, XM106	DXP-117070		11 Jan 62
2. Body	DXP-117071		11 Jan 62
3. Cone-Pellet Assembly	DXP-117072		11 Jan 62
4. Cone	BXP-117073		11 Jan 62
5. Booster Shell	BXP-117074		11 Jan 62
6. Adapter, Priming, XM38	BXP-117075		13 Feb 62
7. Sleeve	BXP-117076		12 Feb 62
8. Washer	AXP-117077		12 Feb 62
9. Washer, Retainer	AXP-117078		12 Feb 62
10. Cap, Blasting, Non-Electric, M7 Assembly	C8830948	MIL-C-45469A 30 Sept 60	1 Apr 60
11. Cup	C8830949		1 Apr 60
12. Ferule	B883095-		1 Apr 60
13. Igniter, Time Blasting Fuse, Weatherproof, M60	F8822497	MIL-I-394C 23 Aug 61	17 Apr 59
14. Cap, Fuse Holder	C8822498		17 Apr 59
15. Collet	B8822499		17 Apr 59
16. Grommet	B8822500		17 Apr 59
17. Washer, Large	A8822502		17 Apr 59
18. Washer, Small	A8822503		17 Apr 59
19. Firing, Assembly	F8822504		17 Apr 59
20. Primer Base Assembly	B8822515		17 Apr 59
21. Relay Assembly	B8796061		28 Apr 56
22. Cup, Relay	B8796069		28 Apr 56
23. Fuse, Blasting, Time, M700		MIL-F-45144 27 June 58	

PARTS LIST (CONTINUED)

Name of Item	Item Dwg. No.	Item Spec. No. and Date	Date of Dwg.
24. Cord, Detonating	DXP-117798 Revision A		10 July 63
25. Box, Wirebound, Packing, Ammunition, for Demolition Kit, Blasting, XM175	C8861840		16 Feb 62
26. Carton, Packing, Ammunition, For Demolition Kit, Blasting, XM175	C8861841		16 Feb 62
27. Ignition Assembly	CXP-117799		3 July 62
28. Inner Carton Assembly	DXP-117798 Revision A		10 July 63

APPENDIX D

PROCEDURE FOR SETTING-UP AND OPERATING DEMOLITION KIT, BLASTING, XM175

PROCEDURES FOR SETTING-UP AND OPERATING DEMOLITION KIT, BLASTING, XM175 TO ANCHOR THE LITTLEJOHN LAUNCHER

1. Unpacking and setting-up the Demolition Kit:

a. Have surveyor lay-off and mark positions for the four packages (Shaped Charges) in accordance with Figure one (1).

NOTE: If no surveyor is available, any suitable method of ascertaining the proper position for the charges as prescribed by figure one (1) is authorized. One such alternative method is to place the launcher in position, mark the position of each leg, and then move the launcher at least ten (10) feet away to provide working room and to prevent damage to the launcher during the subsequent functioning of the shaped charges.

b. Remove the packed kit from its crate by bracing the crate with both feet, grasping one strap in each hand, and carefully lifting the kit from the crate (Figure 2).

c. Tear the barrier paper from the package kit (Figure 3).

d. Grasp the tab and pull toward the operator, thus removing the tape (Figure 4) and open the carton.

e. Turn the carton upside down add gently dump its contents on the ground near the launcher-site (Figure 5). Discard the wooden jet spoilers (Figure 6).

f. Place package one (1) in its proper position as predetermined during step a, Figure one (1).

NOTE: On a windy day, hold the cartons in position by placing any object on the cartons which has sufficient weight to hold them down.

g. Remove the tape from package two (2) and open it (Figure 7).

h. While one man holds package one (1) in position, have a second man place package two (2) in position as determined by step one (1) and shown on figure one (1), allowing primacord to uncoil from the top of package two (2), while carrying package three (3) and four (4) with him.

i. Position packages three (3) and four (4) as indicated by figure one (1) and in the same manner as package two (2) was placed.

CAUTION: IN ORDER TO ALLOW FOR DIFFERENCES IN TERRAIN, AN EXCESS OF PRIMACORD IS FURNISHED. IF THE PRIMACORD IS ALLOWED TO FORM KINKS OR TIGHT COILS, PACKAGES BEYOND THE COIL MAY FAIL TO DETONATE. TO PREVENT SUCH AN OCCURRANCE, PULL THE PRIMACORD IN AN INWARD DIRECTION UNTIL SUCH COILS OR KINKS ARE REMOVED AND HOLD IN POSITION WITH A ROCK OR OTHER SUITABLE OBJECT AS SHOWN IN FIGURE SIX (6). THIS PROCEDURE IS TO BE FOLLOWED, AS REQUIRED, BETWEEN EACH OF THE PACKAGES (Figure 8).

j. Open package five (5) and remove its contents (Figure 9).

k. Remove tape and open package one (1). Unwind primacord with attached adapter from this package (Figure 9).

l. Hold the Adapter, XM38 (Figure 1) in one hand, and, with the other hand, push the blasting cap firmly into the open end of the adapter until it rests against the crimp which is near the closed end of the adapter (Figure 9).

2. Operation of the Demolition Kit:

a. Check the packages against figure one (1) to insure that they are properly positioned. Recheck primacord to assure that no kinks or tight coils are present.

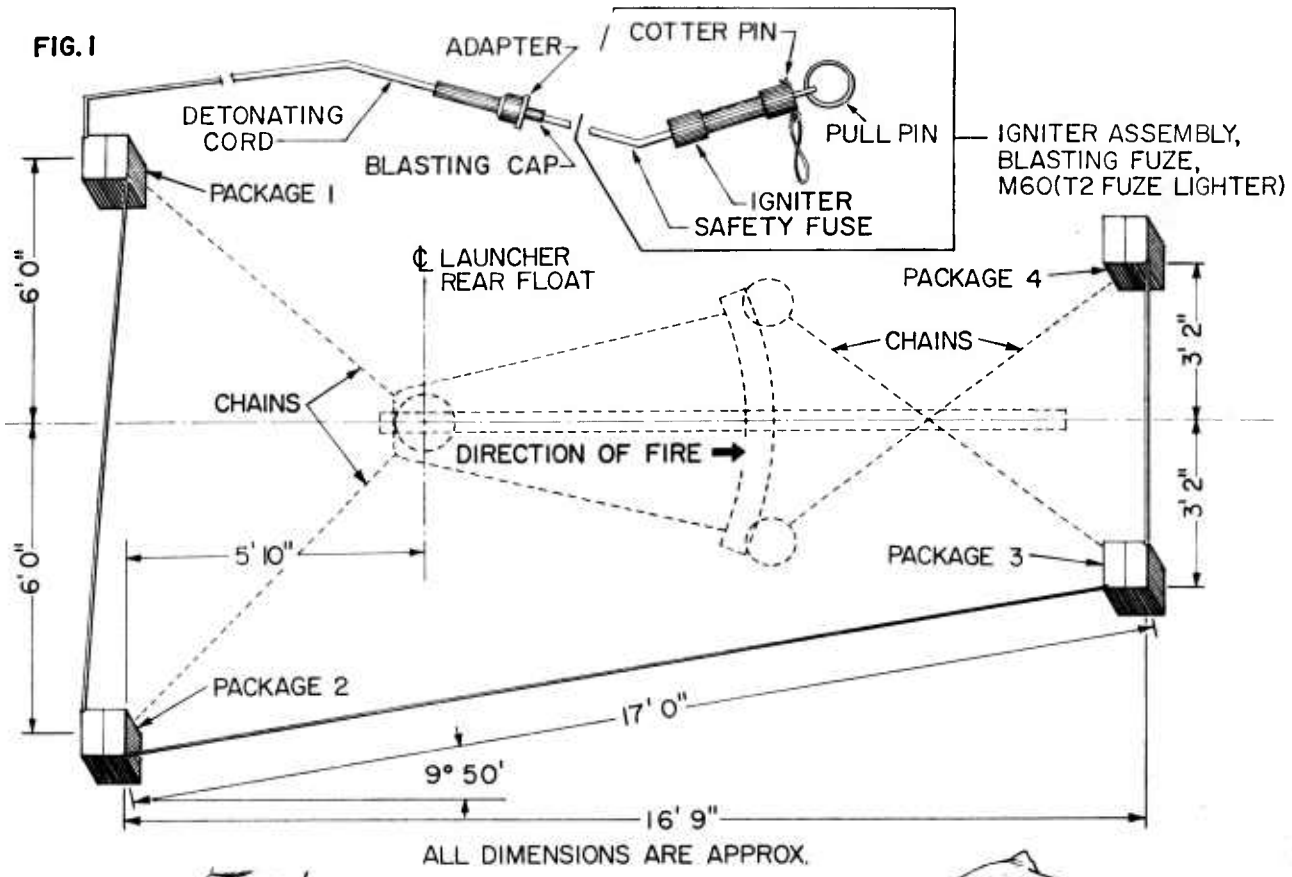
b. Arm the igniter by pulling out the string attached to the safety cotter pin (Figure 10), thus removing the pin.

c. Fire the system py pulling outward (toward the operator) on the pull ring until it is heard to fire (Figure 10). (This will be further evident by the appearance of smoke.)

CAUTION: TAKE COVER IMMEDIATELY AFTER IGNITER FIRES (AT LEAST 40 FEET AWAY). THE XM106 DEMOLITION CHARGES WILL DETONATE APPROXIMATELY 40 SECONDS AFTER FIRING OF THE IGNITER.

d. In the event that the igniter fails to fire, reset it by pushing the pull-rod all the way in to re-engage the firing-pin, then pull outward on the pull-ring until the igniter is heard to fire.

FIG. 1



ALL DIMENSIONS ARE APPROX.

FIG. 2

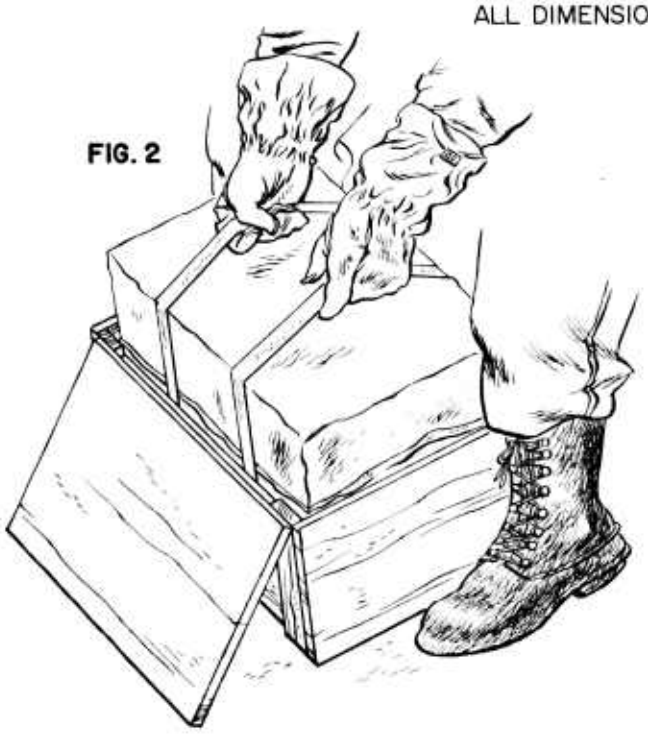


FIG. 3

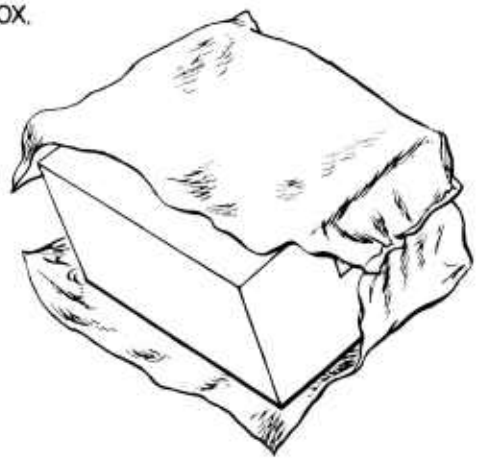
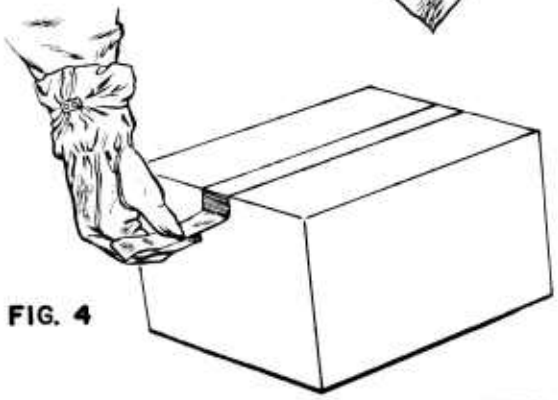


FIG. 4



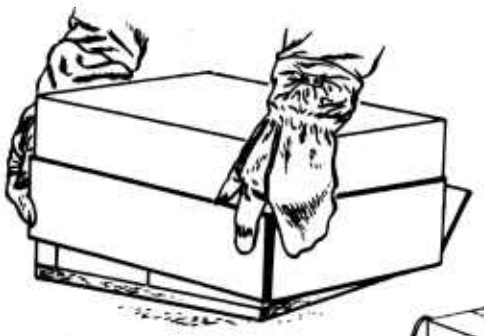
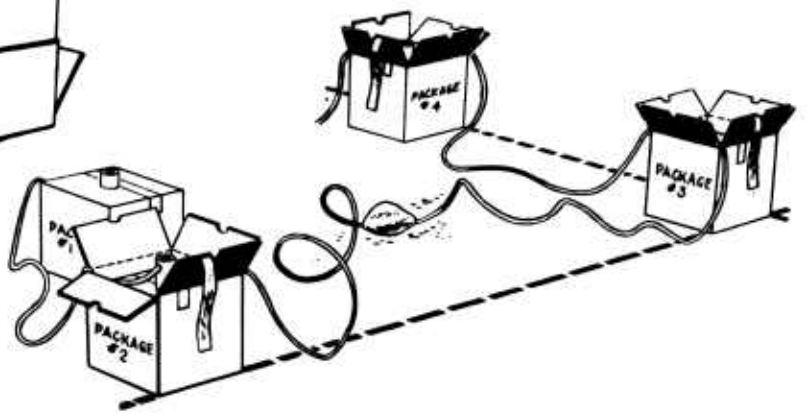


FIG. 5

FIG. 8



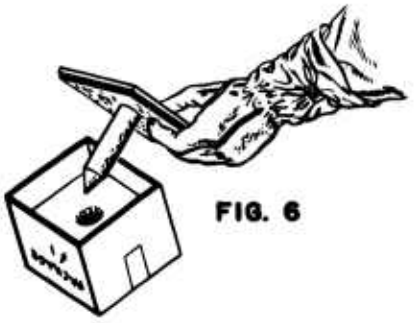


FIG. 6

FIG. 9

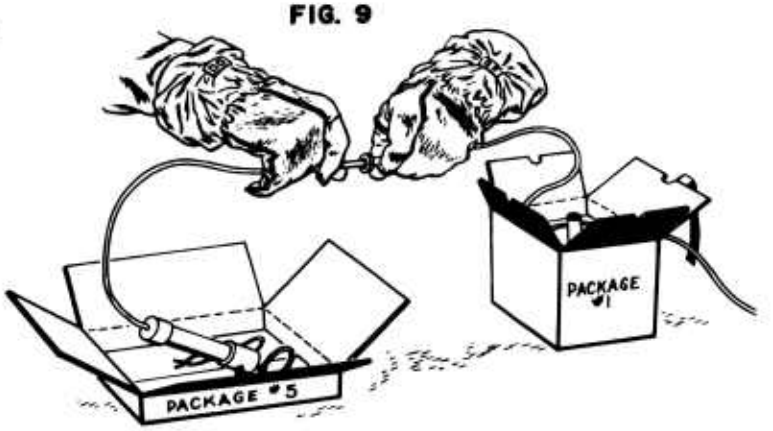


FIG. 7

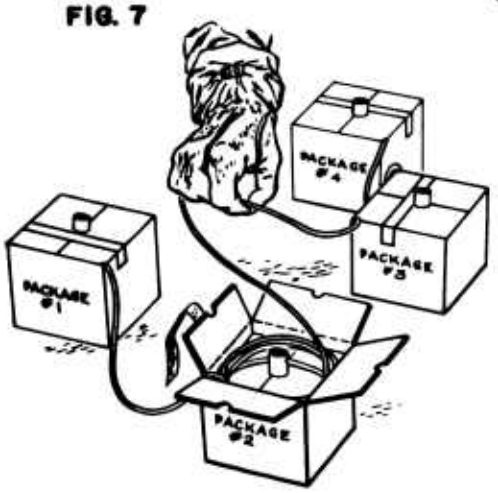
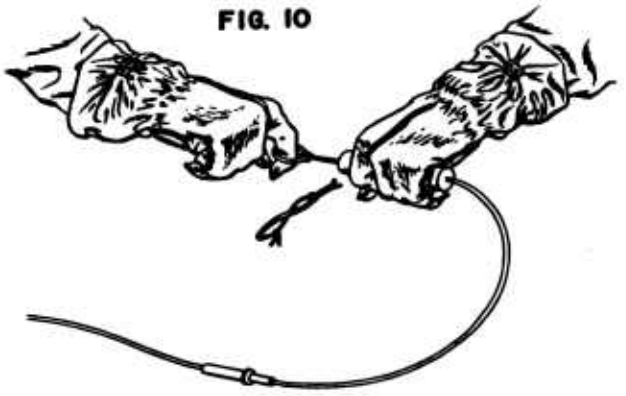


FIG. 10



ABSTRACT DATA

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Picatinny Arsenal, Dover, New Jersey

DEVELOPMENT OF THE DEMOLITION KIT, BLASTING, XM175

Edmund Demberg

Technical Report 3075, September 1963, 88 pp, figures, tables. Unclassified report from the Artillery Ammunition Laboratory, Ammunition Engineering Directorate.

In April 1962, Picatinny Arsenal completed development of the XM175 Blasting Demolition Kit, which produces holes in frozen soil acceptable for hand driving anchoring stakes for the Littlejohn launcher. This kit consists of four XM106 Demolition Charges, a single length of detonating cord strung through transverse holes in each charge and non-electric priming accessories.

A unique packing arrangement enables the kit to be unpacked, assembled, positioned and fired by a User wearing Arctic mittens, in a few minutes. No special training is required to function the kit correctly.

Performance was satisfactory during engineering tests and the kit was released to Rock Island in April 1962. Test data shows the XM175 Kit is reliable and safe for handling by troops. It complies with the necessary military standard tests and I.C.C. storage, handling and shipping regulations.

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II. XM175 demolition kit

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